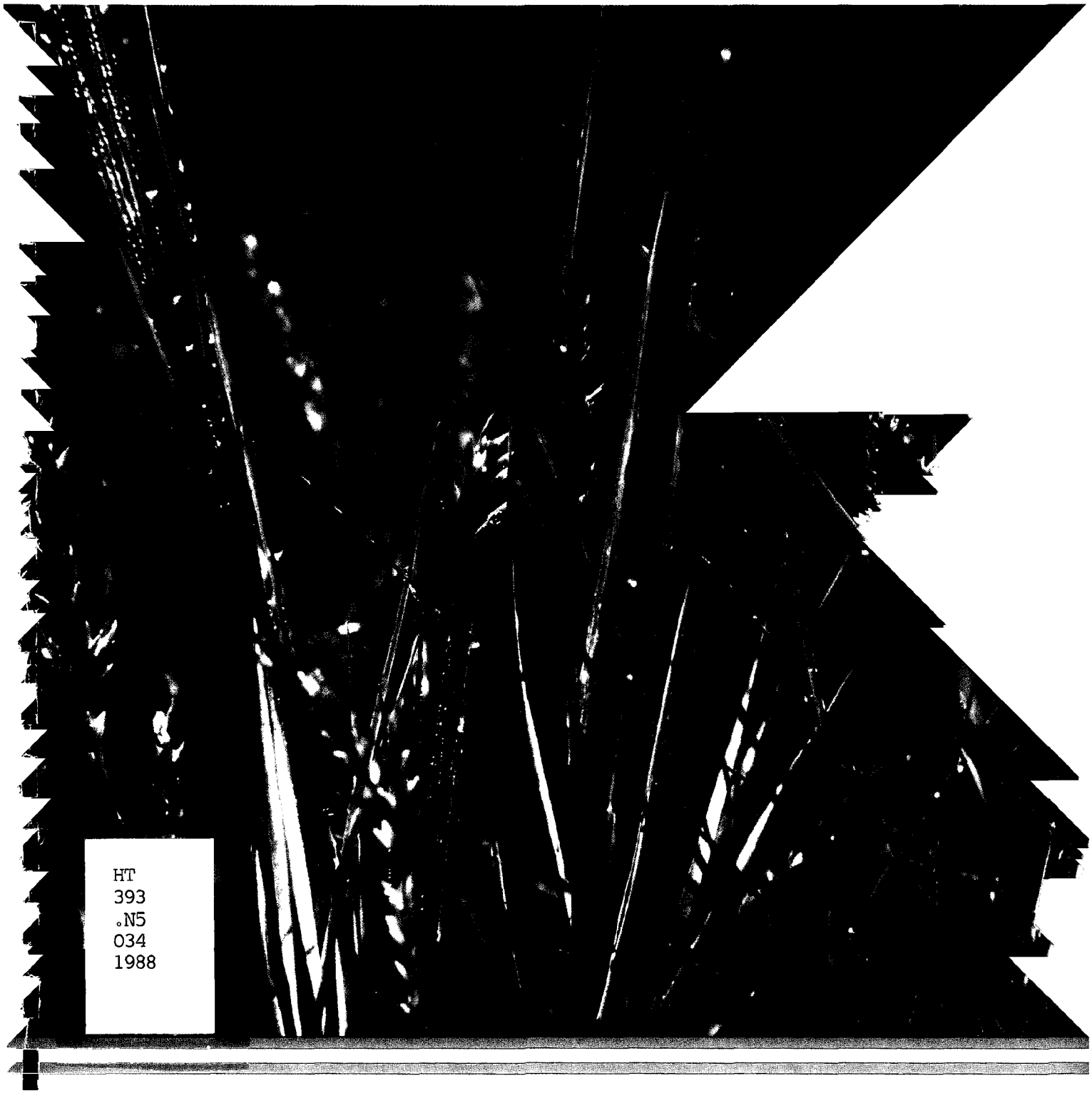
OCEAN COUNTY PLANNING BOARD

COMPREHENSIVE MASTER PLAN



OCEAN COUNTY, NEW JERSEY

OCEAN COUNTY
COMPREHENSIVE MASTER PLAN

DECEMBER 1988

OCEAN COUNTY PLANNING BOARD
119 HOOPER AVENUE
TOMS RIVER, NEW JERSEY 08754
(201) 929-2054

OCEAN COUNTY PLANNING BOARD
COURT HOUSE SQUARE
C.N. 2191
Toms River, New Jersey 08754-2191
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December 7, 1988

To: Ocean County Board of Chosen Freeholders

I am very pleased to transmit to the Board the Ocean County Comprehensive Master Plan. The Comprehensive Master Plan was adopted by the Ocean County Planning Board on December 7, 1988 in accordance with the provisions of the New Jersey County and Regional Planning Act and amends the Plan initially prepared and adopted in 1982.

The preparation and adoption of a Comprehensive Master Plan to guide the physical development of the County is a major responsibility of the Planning Board. The Ocean County Comprehensive Master Plan embodies goals and objectives intended to address issues of regional concern, and to provide a regional perspective to land use and other issues facing Ocean County. It represents a judgement, based upon a careful analysis of the natural and manmade environment, as to the direction in which Ocean County should proceed to achieve an optimum relationship of land uses, protection and enhancement of the natural environment and development of an efficient system of transportation and community services.

The Comprehensive Master Plan presents regional, long-term policies regarding land use that will only be achieved over a significant period of time. It is therefore intended to be a flexible document capable of responding to changing regional considerations and local requirements while seeking to ensure that the Plan's goals and objectives are achieved. A major purpose of the Plan is to serve as a source of information and a reference to municipalities and other planning entities in the development of their planning programs.

The adoption of the Ocean County Comprehensive Master Plan represents a significant milestone for the Planning Board. It will serve as the major policy statement for the County's ongoing, comprehensive planning program. It is recognized, however, that the achievement of the planning concepts and regional policies embodied in the Comprehensive Master Plan can only be attained with the continued support and cooperation of the Board of Chosen Freeholders and the thirty-three constituent municipalities of Ocean County.

Very truly yours,

H. George Buckwald
Freeholder
Chairman

cc: Ocean County Planning Board
Benjamin H. Mabie, Administrator
Steven L. Pollock, Planning Director

OCEAN COUNTY BOARD OF CHOSEN FREEHOLDERS

John C. Bartlett, Jr.	Freeholder Director
Damian G. Murray	Deputy Director
H. George Buckwald	Freeholder
James J. Mancini	Freeholder
Joseph H. Vicari	Freeholder
Benjamin H. Mabie	County Administrator
Daniel J. Hennessy	Clerk of the Board
Franklin H. Berry, Jr., Esq.	County Counsel

OCEAN COUNTY PLANNING BOARD

H. George Buckwald, Freeholder	Chairman
Phillip D. Bertrand	Vice Chairman
John C. Bartlett, Jr., Freeholder Director	Member
Richard E. Lane, PE, County Engineer	Member
Peter H. Carlson	Member
Ernest Kaufman	Member
Ernest A. Manuwald	Member
G. Thomas Oakley	Member
Dr. Jorge Winkler	Member
James J. Mancini, Freeholder	Alternate
Ronald A. Lotrecchio, Assistant County Engineer	Alternate
William C. Campbell	Alternate
William R. Ennis	Alternate
Peter S. Hennes, Esq.	Counsel
Irene L. Hooper	Secretary

OCEAN COUNTY PLANNING BOARD STAFF

Steven L. Pollock, PP	Director
Alan W. Avery, Jr., PP	Assistant Director
Kathleen C. Edmond, PP	Principal Planner
Susan L. Ney	Senior Planner
David McKeon	Assistant Planner
Gary Strich	Assistant Planner
Kimberly R. Sucha	Assistant Planner
John Haas	County Recycling Coordinator
Kathleen Murphy	Recycling Program Aide
George Gordon	Accountant
Gerald Fishman	Senior Drafting Technican
Anthony Donofrio	Drafting Technican
Irene L. Hooper	Chief Clerk
Mary Jane Bavais	Administrative Secretary
Sharon Halucha	Principal Stenographer
Sharon A. Anderson	Principal Clerk Typist
Ruth Przybilski	Clerk Typist

RESOLUTION

December 7, 1988

WHEREAS, the New Jersey County and Regional Planning Act (NJSA 40:27 et seq.) authorizes county planning boards to prepare and adopt master plans to guide the future development of the counties; and,

WHEREAS, the Ocean County Planning Board has prepared the **Ocean County Comprehensive Master Plan** which contains land use, environmental and functional recommendations to provide for the orderly and efficient growth of Ocean County; and,

WHEREAS, copies of the **Ocean County Comprehensive Master Plan** were distributed to each of the County's constituent municipalities for review and comment in accordance with the Statute, prior to a public hearing; and,

WHEREAS, on September 7, 1982, the Ocean County Planning Board adopted the **Ocean County Comprehensive Master Plan** dated August 1982 and all the maps contained therein, following the public hearing; and

WHEREAS, the Ocean County Planning Board adopted revisions to the **Ocean County Comprehensive Master Plan** on June 15, 1983 and March 18, 1987 in accordance with state law; and,

WHEREAS, the Ocean County Planning Board has prepared revisions to the **Ocean County Comprehensive Master Plan** which have been distributed to the appropriate officials of the County; and,

WHEREAS, on December 7, 1988 the Ocean County Planning Board conducted a public hearing on the revisions to the **Ocean County Comprehensive Master Plan.**

NOW, THEREFORE, BE IT RESOLVED that the **OCEAN COUNTY PLANNING BOARD** hereby adopts the revised **Ocean County Comprehensive Master Plan** dated December 1988 and all the maps contained within.

BE IT FURTHER RESOLVED that the MASTER PLAN FOR WASTEWATER MANAGEMENT MAP, SITE TYPES MAP, GROWTH AREAS MAP, WESTERN BERKELEY CIRCULATION PLAN MAP, TRANSPORTATION PLAN MAP, RIGHTS OF WAY FOR COUNTY ROADS MAP, ROAD IMPROVEMENT PLAN MAP and GENERAL DEVELOPMENT PLAN MAP are specifically adopted as part of the **Ocean County Comprehensive Master Plan.**

BE IT FURTHER RESOLVED that a certified copy of this Resolution and the **Ocean County Comprehensive Master Plan** and accompanying maps be forwarded to the **Ocean County Board of Chosen Freeholders,** to each municipality in Ocean County, tp the New Jersey State Planning Commission and the New Jersey Pinelands Commission.

I certify the foregoing to be a true
copy of a Resolution adopted by
the Ocean County Planning Board
on the 7th day of Dec.
1988.

Irene L. Hooper

Irene L. Hooper, Secretary
Ocean County Planning Board

ACKNOWLEDGEMENTS

The Ocean County Comprehensive Master Plan was prepared by the staff of the Ocean County Planning Board under the direction of Mr. Steven L. Pollock, P.P., County Planning Director. The assistance of Mr. Alan W. Avery, Jr., P.P. in preparing the initial draft is hereby acknowledged.

The amendments to the Comprehensive Master Plan adopted in 1987 and 1988 were prepared under the supervision of Ms. Kathleen C. Edmond, P.P.. The assistance of Ms. Susan L. Ney, Senior Planner and Mr. David McKeon, Assistant Planner is greatly appreciated.

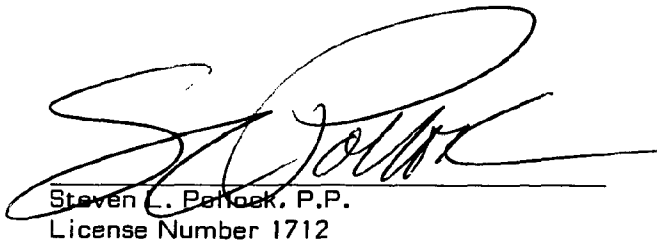
A special thanks is extended to the secretaries for typing and preparing these documents for printing, especially Mrs. Sharon A. Anderson, Principal Clerk Typist. The efforts of Ms. Doreen Bodine and Mrs. Helen Miozza, former secretaries for the Planning Board, in typing the initial Master Plan are also recognized.

Appreciation is also given to Ms. Janet Weinkop for her assistance in formating the report and in the preparation of graphics and to Mr. Gerald Fishman, Senior Planning Draftsman for preparing maps and figures. Recognition of the efforts of the staff of the Department of Printing and Graphic Arts under the direction of Mr. Jerry Cadenhead, Manager, in printing the document is also provided.

Finally, the Planning Board recognizes that the Comprehensive Master Plan represents the culmination of many previous planning studies and programs undertaken by the County. A greatful acknowledgement is hereby made to the many former staff members and members of the Planning Board whose efforts and dedication to planning for the betterment of Ocean County are embodied in this Plan.

Printed by the Ocean County
Department of Printing and Graphic Arts

The Ocean County Comprehensive Master Plan and all subsequent amendments thereto were prepared in accordance with the requirements of the State Board of Professional Planners, N.J.S.A. 13:41 and the original document was appropriately signed and sealed.



Steven L. Pollock, P.P.
License Number 1712

PHOTOGRAPH CREDITS

TABLE OF CONTENTS

CHAPTER 3. PLANNING FOR THE FUTURE. LAND USE AND POLICY

CHAPTER 4. IMPLEMENTATION AND RELATIONSHIP TO OTHER PLANS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

STATUTORY AUTHORITY

A major responsibility of the Ocean County Planning Board is to prepare and adopt a Comprehensive Master Plan to guide the physical development of the County. The statutory authority for the development of a County land use plan is set forth in the New Jersey County and Regional Planning Act, NJSA 40:27-2 et seq.:

> "The county planning board shall make and adopt a master plan for the physical development of the county. The master plan of a county, with the accompanying maps, plats, charts, and descriptive and explanatory matter, shall show the county planning board's recommendations for the development of the territory covered by the plan, and may include, among other things, the general location, character, and extent of streets or roads, viaducts, bridges, waterway and waterfront developments, parkways, playgrounds, forests, reservations, parks, airports and other public ways, grounds, places and spaces; the general location and extent of forests, agricultural areas, and open-development areas for purposes of conservation, food and water supply, sanitary and drainage facilities, or the protection of urban development, and such other features as may be important to the development of the county.
>
> The county planning board shall encourage the co-operation of the local municipalities within the county in any matters whatsoever which may concern the integrity of the county master plan and to advise the board of chosen freeholders with respect to the formulation of development programs and budgets for capital expenditures."

PURPOSE OF STUDY

The Ocean County Comprehensive Master Plan is a policy statement, expressed in both written and graphic form, about the future development of the County. It represents a judgment based upon a careful analysis of the natural and manmade environment, as to the direction in which Ocean County should proceed to achieve an optimum relationship of land uses, protection and enhancement of the natural environment and development of an efficient system of transportation and community services.

The goals and objectives embodied in this Plan are intended to address issues of regional concern to the residents of Ocean County, and to provide a regional perspective to land use and other issues facing Ocean County. It is recognized that in New Jersey, and especially the southern portion of the State, a hierarchy of planning and regulatory authority exists that will influence or determine the future use of land. This Plan seeks as one of its major purposes to recognize the policies of municipalities, regional agencies and the State regarding the future development of Ocean County and to reconcile any apparent conflicts that may exist between those policies.

Historically, the primary responsibility for land use decisions has been entrusted to municipalities through local master planning, zoning and subdivision and site plan controls. The Municipal Land Use Law, NJSA 40:55D-1 et seq., continues that authority to a large extent. However, the law also requires municipalities to include a specific policy statement in its master plan indicating the relationship of the proposed land use plan to the master plan of the County. This document is intended to serve as a source of information and a reference to municipalities in the development of their master plans.

Another statute that has directly and significantly impacted the future development of Ocean County is the New Jersey Pinelands Protection Act, NJSA 13:18A-1 et seq., which was enacted in June, 1979. The Pinelands Comprehensive Management Plan adopted by the Pinelands Commission pursuant to this Act and Section 502 of the National Parks and Recreation Act of 1978 sets forth substantive land use programs and development standards which the County and its municipalities, by law, are required to incorporate into their master plans and land development standards. Certification of this Plan by the Pinelands Commission will result in Ocean County being in compliance with the New Jersey Pinelands Protection Act and in conformance with the minimum standards of the Pinelands Comprehensive Management Plan.

Other land use programs of concern include the New Jersey Coastal Zone Management Plan, Bay and Ocean Shore Segment, the State Development and Redevelopment Plan being considered by the recently created State Planning Commission and the agriculture program initially proposed by the Grass Roots Report on Agriculture. The relationship of these plans and programs to the Ocean County Comprehensive Master Plan will be discussed in detail in a following section of this report.

BACKGROUND OF STUDY

The Ocean County Planning Board adopted its initial Master Plan in 1966. The Chairman of the Planning Board at that time stated in his letter of transmittal to the Board of Chosen Freeholders that the Plan presented long-range recommendations - looking forward to the time period after 1980 when there might be nearly three hundred thousand people living in Ocean County. He also noted that completion of the Master Plan did not imply that the the planning program for Ocean County was finished. Continuing review and periodic updating of the Master Plan in light of unforeseen events and new planning concepts was seen as a vital segment of an emerging planning program for Ocean County.

The foresight of that early Board has been affirmed by the changes experienced in Ocean County during the past twenty years. The United States Bureau of the Census

determined that there were over 346,000 residents of Ocean County in 1980, well in excess of the 300,000 predicted in the 1966 Plan. Furthermore, a maturing environmental and social awareness by both County officials and residents has resulted in an expanded role for the County's planning program. Consequently, the Planning Board has initiated a broad range of planning studies to address these concerns resulting in the implementation of a variety of ongoing programs.

The 1966 Ocean County Master Plan has, therefore, been periodically updated and expanded by the completion and adoption of various studies as elements of the Master Plan. Examples include the Master Plan for Wastewater Treatment Facilities and the 1995 Transportation Plan. In 1975, the adoption by the Planning Board of the Ocean County Concept Plan revised and refined the land use recommendations of the initial plan. The Concept Plan also served as a framework for completion of the "208" Areawide Water Quality Management Plan in 1979.

The Comprehensive Master Plan represents the culmination of previous planning studies undertaken by the Planning Board.

Preparation of the Areawide Water Quality Management Plan was perhaps the most ambitious and comprehensive planning effort yet undertaken by the County. The several technical elements of the Areawide Plan examined in detail issues such as existing and projected population, land use, environmental resources, stormwater management and drainage, wastewater treatment facilities, groundwater management and surface water quality. Additional County plans and basic studies include the Ocean County District Solid Waste Management Plan, the Robert J. Miller Airpark Master Plan and various transportation and technical studies undertaken as a part of the Subregional Transportation Program. Taken together the information, findings and policies contained in those documents represented the basic studies necessary to develop a thorough and comprehensive County Master Plan.

In 1982, the Planning Board adopted a new Ocean County Comprehensive Master Plan. The 1982 Master Plan represented the culmination of previous planning studies and programs and attempted to coordinate past efforts with future needs. The intent was to achieve a coherent and rational overall plan for the physical, social and economic

development of Ocean County. Its completion represented a significant milestone in the continuing planning program of the Ocean County Planning Board.

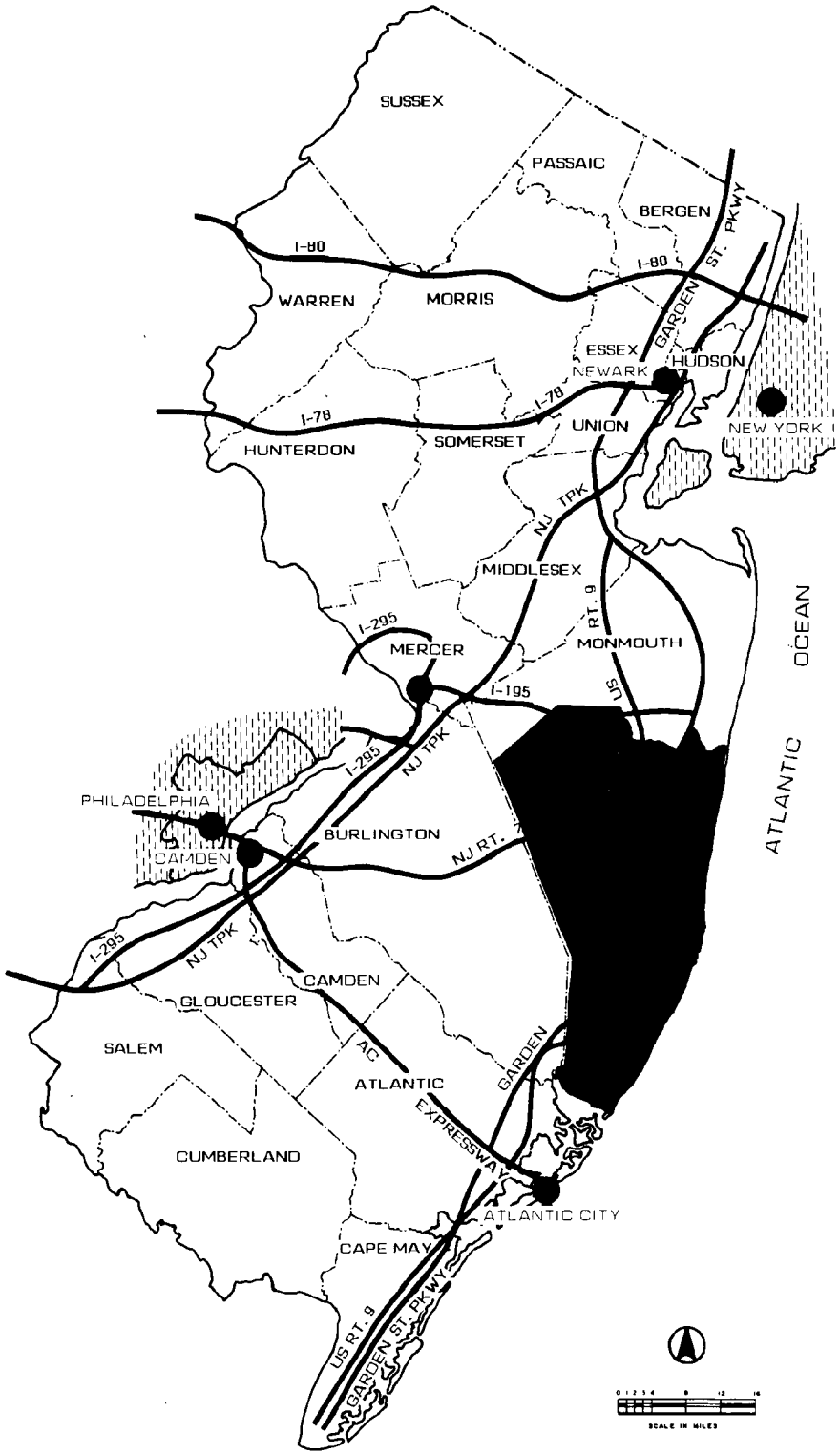
As before, the Master Plan was intended to be a flexible document capable of responding to changing regional considerations and local requirements while seeking to assure that the Plan's goals and objectives were achieved. Since its adoption in 1982 there have been significant changes at both the County and state level that affect the Comprehensive Master Plan. Locally, Ocean County has continued to develop, maintaining its position as one of the most rapidly growing Counties in New Jersey. Continued growth and development has resulted in a need to review the relevancy of the Master Plan's recommendations, particularly with regard to increased demands on the County's transportation system. The County has also continued to refine and implement several functional plans and programs recommended in the 1982 Comprehensive Master Plan, especially in providing an environmentally sound program for wastewater treatment and solid waste management.

At the state level, enactment of several planning related programs may also affect the goals, objectives and policies of the Planning Board. Establishment of a State Planning Commission in 1985 with the mandate to prepare a State Development and Redevelopment Plan is a major new state planning initiative. Creation of the state Council On Affordable Housing with authority to develop a program addressing low and moderate income housing requirements is a related program with broad implications for municipalities in Ocean County. Passage of the New Jersey Water Supply Management Act, Freshwater Wetlands Act, Mandatory Recycling Act, adoption of the state Water Supply Master Plan, creation of the Transportation Infrastructure Program and several other related programs have already directly impacted the growth and development of Ocean County.

In view of these changing local and state conditions, the Planning Board has periodically revised the Comprehensive Master Plan. In 1983 and 1987 amendments were adopted to address conformance with the provisions of the Pinelands Protection Act. As a result, the Plan has been certified by the New Jersey Pinelands Commission. In December, 1988 the transportation element of the Master Plan was revised to address municipal and community concerns regarding a proposed road improvement project.

It is important to emphasize that the principal land use recommendations of the Ocean County Comprehensive Master Plan have remained the same. This underscores both the validity of the initial planning concepts and the recognition that the County plan presents regional, long-term policies regarding land use that will only be achieved over a significant period of time. As before, it further recognizes the need for periodic review as part of an ongoing, comprehensive County planning program. This can only be achieved through

Figure 1-1
Regional Location



the continued advice and support of the Ocean County Planning Board, the Board of Chosen Freeholders and the thirty-three constituent municipalities of Ocean County.

REGIONAL LOCATION

Ocean County is located in the Atlantic Coastal Plain in central New Jersey. One of four New Jersey Counties with an Atlantic Ocean coastline, Ocean County also lies on the periphery of two of the Nation's largest metropolitan centers. New York City is located approximately 60 miles to the north and Philadelphia lies 50 miles to the west. This proximity to these large urban regions and the natural environmental amenities of the County has had a profound influence on the County's past development and settlement patterns. It is anticipated that this influence will continue in the future, although this influence will perhaps be less pronounced as the County increasingly develops its own identity.

HISTORICAL DEVELOPMENT

Although Ocean County has been settled since colonial times, its presence as a separate political entity is of relatively recent origin. Ocean County was created from lands divided from Monmouth County on February 15, 1850. Ocean County's political subdivisions at that time consisted of Jackson, Plumsted, Stafford, Union, Dover and Brick Townships. Part of Jackson Township was returned to Monmouth County in 1851. Little Egg Harbor, originally a part of Burlington County, was added in 1891.

The townships which initially formed Ocean County date from a period much earlier than the creation of the County in 1850. Stafford Township, incorporated in 1749, is the oldest incorporated municipality in Ocean County. Other early incorporated municipalities include Dover, 1767; Little Egg Harbor, 1798; Jackson, 1844; Plumsted 1845; Union (now Barnegat), 1846; and Brick, 1850. The other twenty-six municipalities constituting Ocean County were formed from lands taken from the above townships. The late 19th and early 20th centuries witnessed the formation of many new municipalities, especially on the barrier beaches as new resort areas were developed. On the mainland, many of the traditional communities were incorporated as boroughs such as Lakehurst and Beachwood. Other municipalities were established by developers seeking to create new communities or as in the case of Island Heights by religious organizations. The following table lists the municipalities and the year they were incorporated.

Table 1-1
Municipal Dates of Incorporation

Municipality	Year Incorporated	Municipality	Year Incorporated
Barnegat	1846	Long Beach	1899
Barnegat Light	1904	Manchester	1865
Bay Head	1886	Mantoloking	1911
Beach Haven	1890	Ocean	1876
Beachwood	1917	Ocean Gate	1918
Berkeley	1875	Pine Beach	1925
Brick	1850	Plumsted	1845
Dover	1767	Point Pleasant	1920
Eagleswood	1874	Point Pleasant Beach	1886
Harvey Cedars	1894	Seaside Heights	1913
Island Heights	1887	Seaside Park	1898
Jackson	1844	Ship Bottom	1925
Lacey	1871	South Toms River	1927
Lakehurst	1921	Stafford	1749
Lakewood	1892	Surf City	1884
Lavallette	1887	Tuckerton	1901
Little Egg Harbor	1798		

Source: Ocean County Areawide Water Quality Agency, 1978.

EARLY SETTLEMENT AND COMMERCE

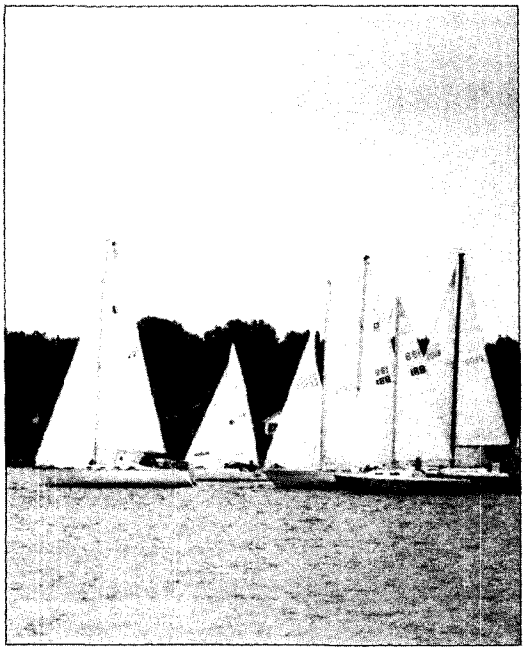
The Lenni Lenape Indians were the first residents of the Ocean County area. These native residents were hunters and fishermen that migrated seasonally through the Manasquan River area, settling near the shore during the warm weather. County Route 537 which now forms the northwestern border between Monmouth and Ocean Counties was known as the Burlington Path, a major shore route for the Indians. Squankum Road in Lakewood Township was also a principal Indian trail. Many present day place names reflect their origin as Indian settlements. Manasquan, Metedeconk and Manahawkin are examples of this influence.

Henry Hudson sighted the lands of Ocean County from his ship in 1609. The first European visitor to the area, Captain Cornelius Jacobsen Mey, came ashore near Egg Harbor in 1614. In 1673, Captain William Tom, a British officer, visited the area. Ocean County's largest river and the town of Toms River are thought to be named after him. The first known European settler was Henry Jacob Falkinburg of Schleswig-Holstein who purchased 800 acres of land near Tuckerton from the East Jersey Proprietors in 1698.

Several years later, Edward Andrews, a Quaker from Oyster Bay, Long Island, bought land nearby and built the area's first gristmill in 1704.

Early settlers were quick to commercially exploit the natural resources of the area. The earliest commerical activities in Ocean County were whaling, fishing and shipbuilding. Families involved in these industries settled along the bay shores and rivers. Centers of shipbuilding were located in Waretown, Toms River, Barnegat and Tuckerton. The market for locally harvested fish and shellfish extended to New York and Philadelphia.

During the Revolutionary War, Toms River and Tuckerton became important privateering ports after Great Britain had blockaded the larger coastal cities. Captured British cargoes were carried to Philadelphia via roads through the Pine Barrens. The Continental Congress established a salt works at Toms River to obtain salt for manufacturing gunpowder and preserving food. As a result of these hostile activities, Toms River was burned to the ground by the British in 1782. Captain Joshua Huddy and his troops defended the town but were defeated and massacred. A historical marker has been placed near the Dover Township Municipal Building to commemorate this important historical event.



Sailboat racing on the Toms River continues Ocean County's long maritime tradition.

At the conclusion of the Revolutionary War less than 2,000 persons lived in what is now Ocean County. These first residents continued to develop the County's natural resources. The shipbuilding industry prospered and with it, harbor business flourished. President Washington made Tuckerton the official port of entry for the thirty miles of New Jersey coast extending from Barnegat Inlet south to Brigantine Inlet.

Lumbering was another major industry of the area. By 1740, sawmills had appeared on most of the major rivers in the County, including the Manasquan, Kettle Creek and Toms River. The lumbering industry capitalized on the area's hardwood forests and vast stands of cedar. The rivers were used to transport lumber to the mills and shipbuilding centers and helped open the Pine Barrens to early settlement.

Iron works, which utilized bog iron from the Pine Barrens and the ample supply of trees for fuel, were first started near Lakehurst in 1789 by David Wright. Other forges were soon operating at Laurelton, Lakewood, Bamber Lake and Cedar Creek. At one point, the industry was so well established that ships brought iron ore from the Fishkill region on the Hudson River to the Cedar Creek forges. Iron works had largely disappeared from the area by the time of the Civil War. The discovery of coal in Pennsylvania and better sources of iron ore contributed to their decline.

During the mid-1800's, cranberry growing developed into a major agricultural industry, with the cranberry growers utilizing bogs where cedar swamp forests had been removed earlier for lumber. The first cranberries were cultivated by John Webb near Cassville in 1845, and by 1869, over one-half of the total cranberry production in the United States was from New Jersey. The success of the cranberry industry began to subside in the early 1900's, principally as a result of plant diseases which became especially widespread after 1925. There remain, however, several active cranberry bogs in Ocean County which continue to produce this typical Pinelands crop. The Mill Pond Bog in Double Trouble State Park, at one time the largest cranberry bog in the State, has been restored to production by a private grower under the supervision of the New Jersey Department of Environmental Protection.

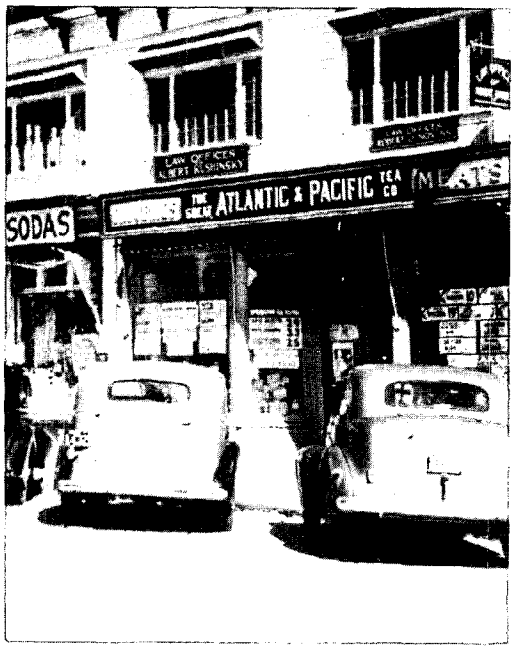
Cranberry harvesting near Cassville in the 1880's, from a woodcut in "Harper's Weekly".

Poultry farms and other agricultural uses were important economic activities in the early 1900's. Poultry and egg production burgeoned during World War II, but declined rapidly in the 1950's after a collapse in egg prices. Today agricultural activity in Ocean County is principally centered in the northwest, especially in Plumsted and sections of Jackson Townships. Poultry farms, egg production, truck farming and equestrian centers continue as the dominant agricultural enterprises in this portion of the County.

The resort industry of the New Jersey Shore began to flourish during the latter part of the 1800's and early 1900's. Railroads brought inland resorts such as Lakewood and the shore communities within easy reach of the Philadelphia and New York metropolitan regions. The commercial activities associated with the seasonal resorts quickly became the economic backbone of the County and has for many years been the County's most lucrative industry.

In the early 1950's, there began a nationwide trend towards suburbanization. This involved a pronounced migration of people outward from the older urban centers into previously sparsely populated or rural areas. The opening of the Garden State Parkway in 1954 permitted Ocean County to participate in this trend by bringing the County into reasonable commuting distance of employment centers in northern New Jersey and the New York Metropolitan Region. This had a tremendous effect on the growth and development of the County. A primarily rural County with a population of 56,000 in 1950, the County's population had increased to 346,000 persons in 1980.

Suburbanization extended into Ocean County principally along the route of the Garden State Parkway. Interchanges with major east-west routes served as focal points for development. It is, therefore, possible to locate the new development of the County within three general development regions. These are the coastal beaches, the bay corridor and the western inland area. A map depicting the general extent of these areas is provided on the following page.

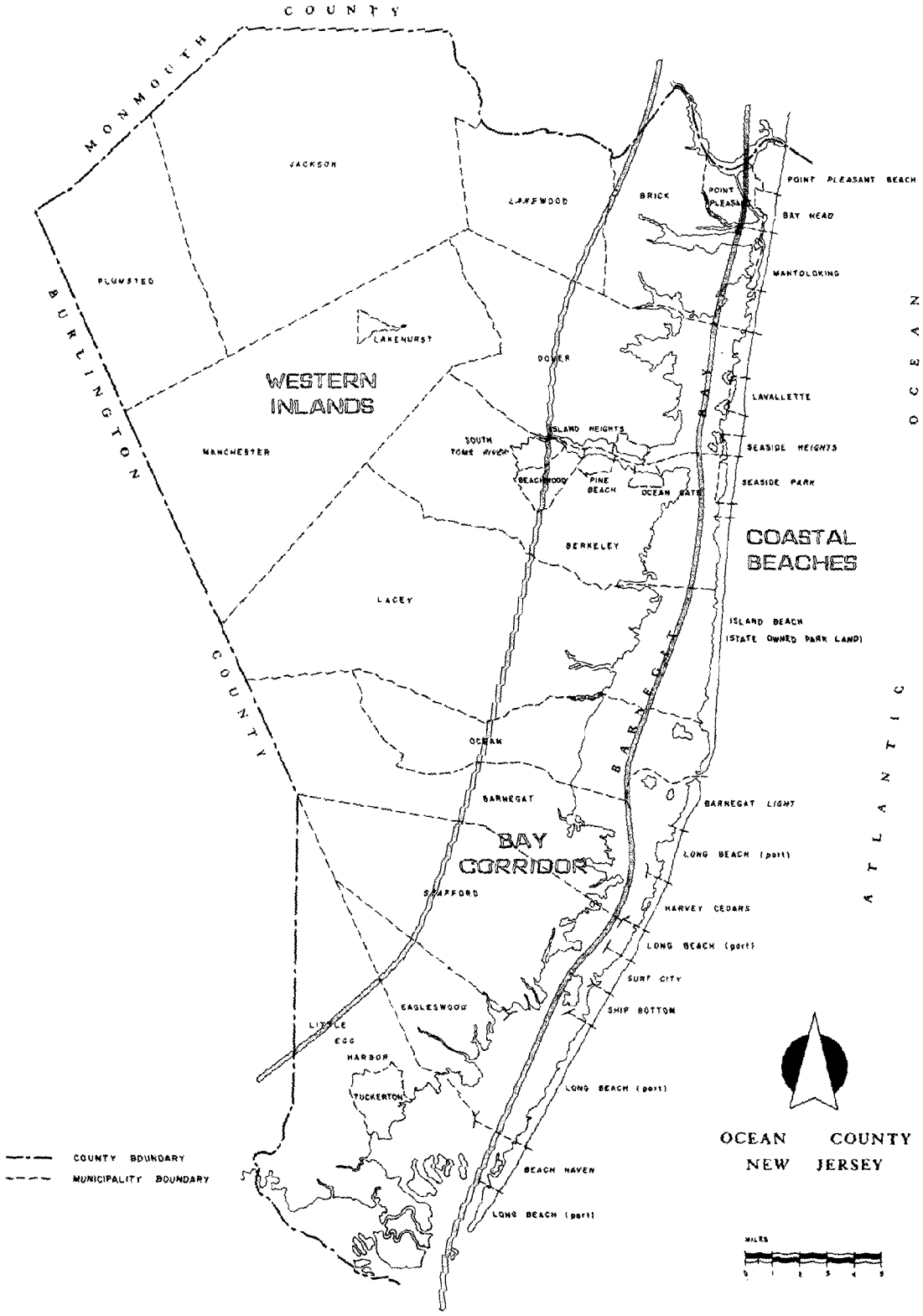


The last three decades of growth have brought change to the communities of Ocean County.

Development in Ocean County has traditionally focused along the coastal beaches and in urban and suburban concentrations in the bay corridor. Inland areas west of the Garden State Parkway are for the most part sparsely developed with large tracts of open space, forested and agricultural lands. Generally, development has occured in a north-south direction along the coastal beaches and the corridor served by Route 9 and the Garden State Parkway. In addition, major interchanges along the Parkway have encouraged secondary east-west corridors. These include County Routes 526 and 528 from Brick Township to Lakewood Township; along State Highway 37 from Dover Township to Manchester Township and Lakehurst Borough; and, along State Highway Route 72 from Beach Haven West to Manahawkin and Ocean Acres in Stafford Township.

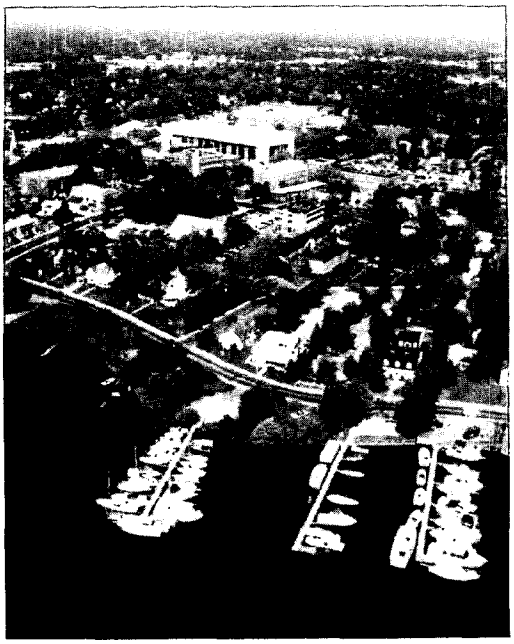
The coastal beach region extends from Point Pleasant Beach south to Long Beach Township. It is comprised of the County's two barrier beaches: the Island Beach Peninsula and Long Beach Island. It is a generally continuous strip of development interrupted only by Island Beach State Park, Barnegat Lighthouse State Park, and the Holgate Unit of Edwin

Figure 1-2
Development Regions



B. Forsythe National Wildlife Refuge. In 1980, the resident population of the coastal beach region was 22,039. The summer population is estimated at 240,000 persons on a peak summer day. The present development of the coastal beach area consists primarily of seasonal and year-round housing units, commercial and commercial recreation uses.

The bay corridor extends the length of the County and consists of the mainland area bordered by Barnegat Bay to the east and the Garden State Parkway on the west. It includes many of the County's older population centers such as Point Pleasant, Toms River, Manahawkin and Tuckerton. Initially, development on the mainland was focused at the bridge crossings to the barrier beaches. These concentrations later expanded and now extend along the major roads and highways. Much of Ocean County's new development since 1960 has occurred in the bay corridor, principally in the municipalities north of the Toms River. This development region is the most heavily populated area of the County and one of the fastest growing suburban areas in the State. Development is comprised principally of residential housing, including adult communities and lagoon housing. This region contains most of the County's commercial and office development as well.



A 1987 aerial view of Toms River, the County seat, illustrates the growth of Ocean County.

The inland region contains the land west of the Garden State Parkway. This development region includes vast tracts of vacant and wooded land, a major portion of the New Jersey Pine Barrens and tremendous acreages of publicly owned land. Several major federal installations, specifically the Lakehurst Naval Air Engineering Center and parts of Fort Dix and Maguire Air Force Base are also situated in this region. In addition, the northwest section centered in Plumsted Township is the principal agricultural area in Ocean County.

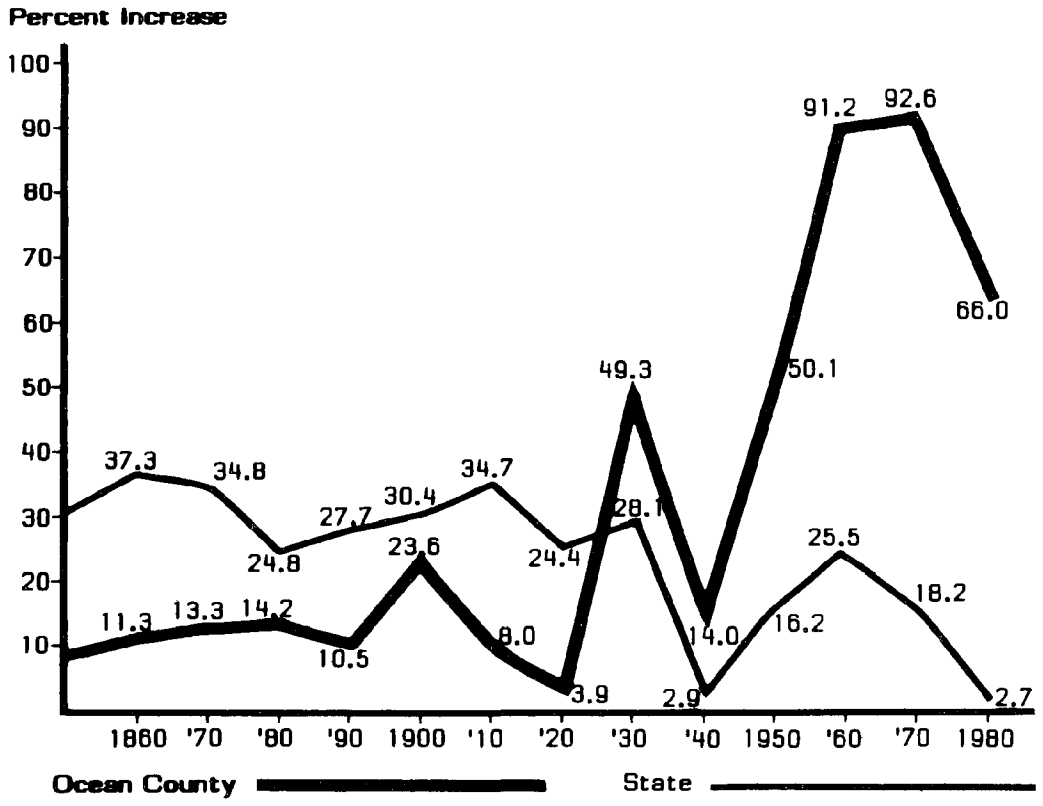
This area also contains several of the County's traditional development centers including Lakewood, Lakehurst, Cassville in Jackson Township and New Egypt in Plumsted Township. More recent development has located in northwestern Dover, western Berkeley, Manchester and Jackson Townships. The Whiting area of Manchester has become a center for new commercial and residential development, especially adult communities. Several large adult communities are located in western Berkeley as well. Major development types include housing, agriculture and industry, especially the extraction of sand and gravel.

CHAPTER 2
THE PRESENT CONDITION

EXISTING POPULATION

The population of Ocean County has increased in each of the decades since its formation in 1850. In each of the last three decades, Ocean County has led the State in population growth. The 1950 population of 56,609 has increased by 289,429 persons to a 1980 population of 346,038. In the ten years since 1970, the County grew by over 66 percent, adding 137,568 new residents. This compares to a 2.7 percent increase in the State's total population for the same period.

Figure 2-1
Population Growth Rates of Ocean County and the State



Source: US Bureau of the Census, Census of Population and Housing, 1980.

There are a myriad of factors responsible for the past thirty years of rapid growth in Ocean County. However, to a degree, the growth of the County reflects the general settlement pattern of the Nation as a whole, which has experienced a dramatic shift in population from the urban centers to suburban areas. Population shifts in New Jersey mirror this nationwide trend. Older cities and urban areas have lost population or have low rates of growth, while suburban areas have experienced rapid growth.

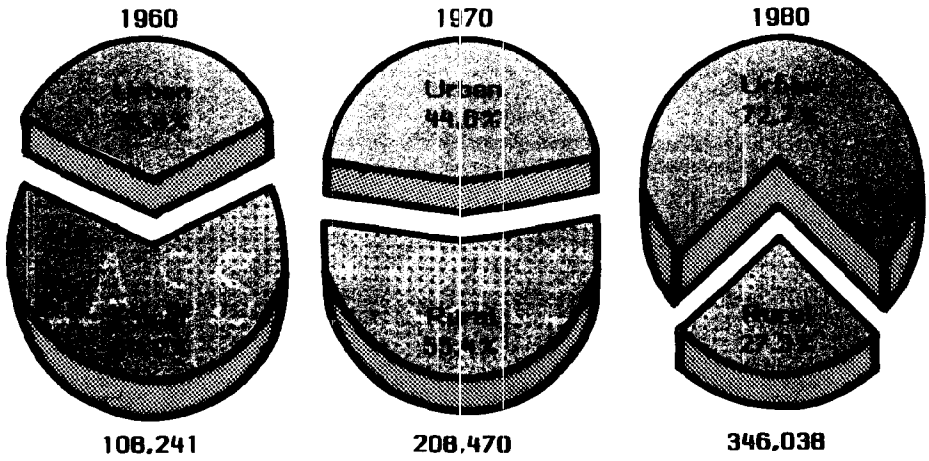
Table 2-1
Historical Population of Ocean County and the State

Year	Ocean County	Percent Increase	New Jersey	Percent Increase
1850	10,043	0	489,555	31.1
1860	11,176	11.3	672,035	37.3
1870	12,658	13.3	906,096	34.8
1880	14,455	14.2	1,131,116	24.8
1890	15,974	10.5	1,444,933	27.7
1900	19,747	23.6	1,883,669	30.4
1910	21,318	8.0	2,537,167	34.7
1920	22,155	3.9	3,155,900	24.4
1930	33,069	49.3	4,041,334	28.1
1940	37,706	14.0	4,160,165	2.9
1950	56,609	50.1	4,835,329	16.2
1960	108,241	91.2	6,066,782	25.5
1970	208,470	92.6	7,171,112	18.2
1980	346,038	66.0	7,364,823	2.7

Source: US Bureau of the Census, 1850-1980.

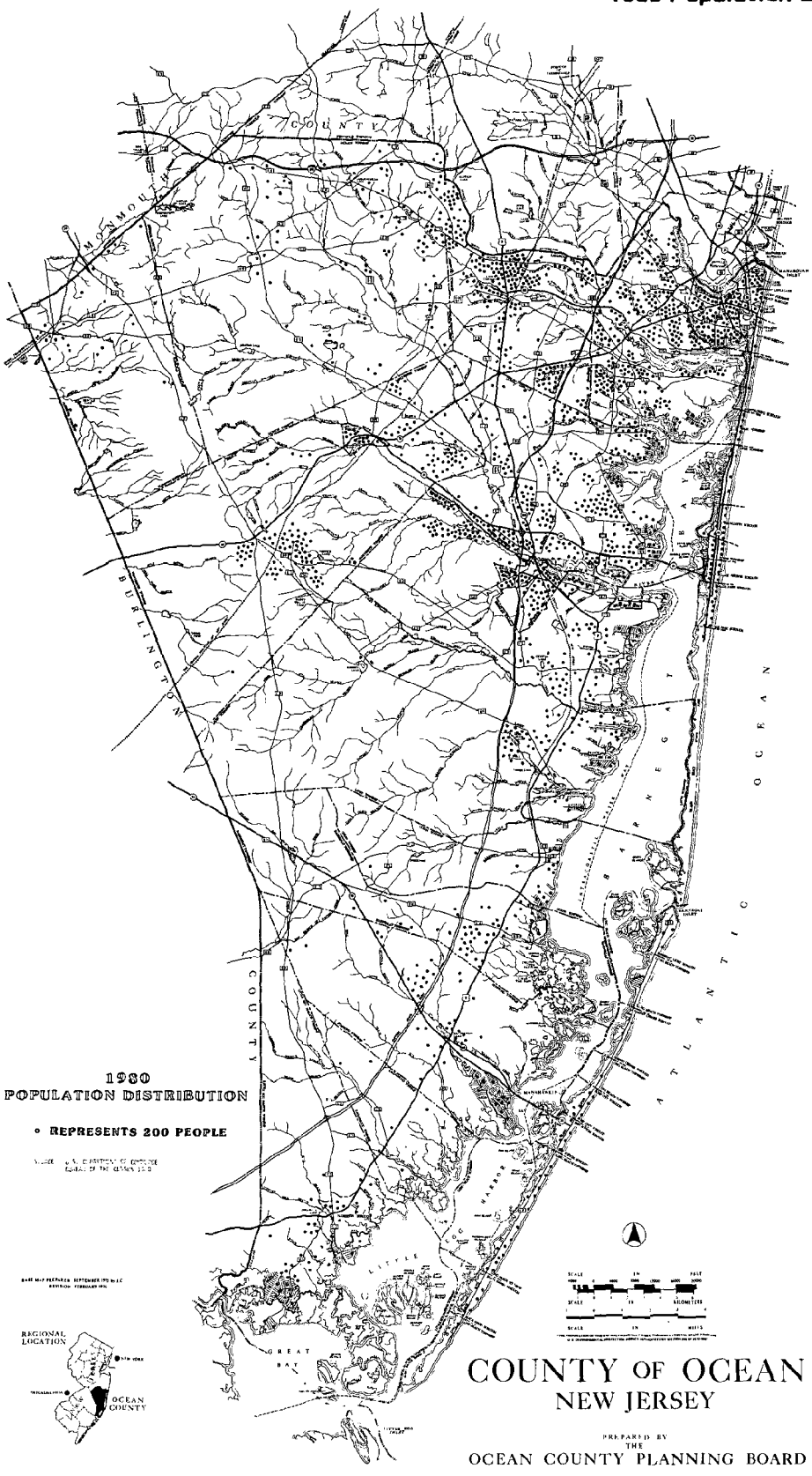
The map on the following page illustrates the 1980 distribution of population in the County. Population is concentrated in the northeastern and central municipalities, and along the barrier beaches. Dover Township is the County's most populated municipality, followed by Brick, Lakewood, Manchester, Jackson and Berkeley Townships. The US Bureau of the Census reports that the number of County residents living in areas classified as rural is decreasing as a percent of the County's total population. Overall density remains low, however, with 543 persons per square mile compared to the State average of 983.

Figure 2-2
Ocean County Urban and Rural Population



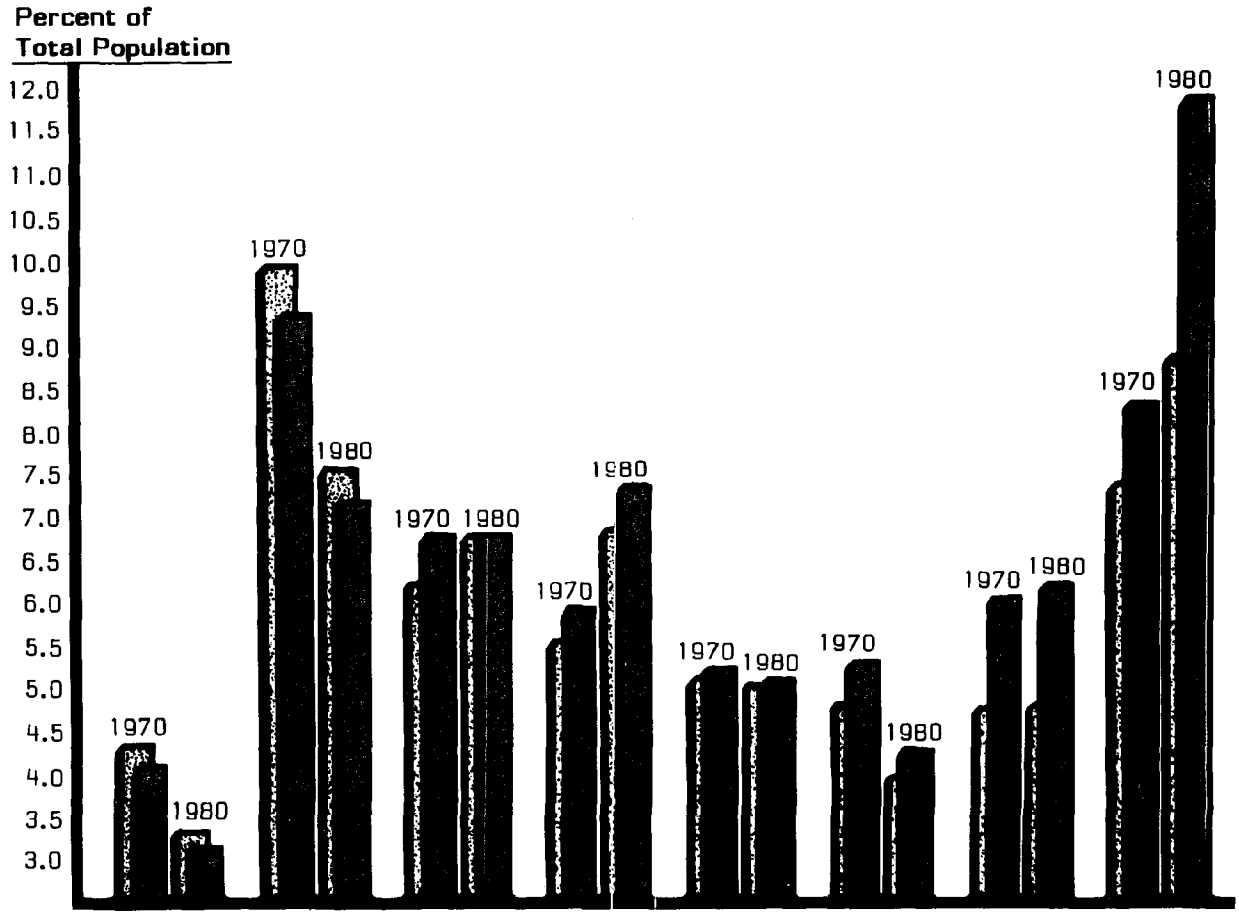
Source: US Bureau of the Census, Census of Population and Housing, 1980.

Figure 2-3
1980 Population Distribution



An important characteristic of existing population is its age distribution. Increasingly, Ocean County's population is comprised of older age groups. The median age in 1980 was 35.5 years as compared to 32.5 years in 1970. Conversely, the County's school age population comprised a smaller percentage of the total population. In part, this reflects the attractiveness of age-restricted adult communities as a land use in Ocean County. It also is a function of a nationwide trend to smaller households and a decrease in the fertility rate for women of childbearing age. A comparison of the County's population by age and sex is presented in Figure 2-4. This figure clearly shows a decrease in the school age children age group and a substantial increase in the age groups 65 years and older.

Figure 2-4
Ocean County Population by Age and Sex



	1970	%	1980	%
Female	107,575	51.6	181,992	52.6
Male	100,895	48.4	164,046	47.4

Source: US Bureau of the Census, Census of Population, 1970, 1980.

Table 2-2
Population By Race and Spanish Origin

Municipality	1980 Total Population	White	Black	Other	Spanish Origin *
Barnegat Township	8,702	8,391	178	133	250
Barnegat Light Borough	619	611	2	6	1
Bay Head Borough	1,340	1,335	2	3	8
Beach Haven Borough	1,714	1,695	3	16	9
Beachwood Borough	7,687	7,623	13	51	134
Berkeley Township	23,151	22,543	535	73	288
Brick Township	53,629	53,092	121	416	771
Dover Township	64,455	63,488	279	688	986
Eagleswood Township	1,009	1,000	4	5	5
Harvey Cedars Borough	363	363	0	0	3
Island Heights Borough	1,575	1,566	2	7	18
Jackson Township	25,644	24,450	706	488	940
Lacey Township	14,161	14,088	14	59	174
Lakehurst Borough	2,908	2,610	164	134	100
Lakewood Borough	38,464	31,327	5,406	1,731	3,252
Lavallette Borough	2,072	2,061	0	11	5
Little Egg Harbor Township	8,483	8,407	23	53	132
Long Beach Township	3,488	3,465	3	20	17
Manchester Township	27,987	26,692	1,042	253	405
Mantoloking Borough	433	430	2	1	0
Ocean Township	3,731	3,699	8	24	38
Ocean Gate Borough	1,385	1,376	0	9	14
Pine Beach Borough	1,796	1,781	2	13	17
Plumsted Township	4,674	4,407	198	69	128
Point Pleasant Borough	17,747	17,642	48	57	185
Point Pleasant Beach Borough	5,415	5,339	56	20	48
Seaside Heights Borough	1,802	1,782	2	18	23
Seaside Park Borough	1,795	1,788	2	5	30
Ship Bottom Borough	1,427	1,426	1	0	11
South Toms River Borough	3,954	3,218	580	156	292
Stafford Township	10,385	10,295	22	68	120
Surf City Borough	1,571	1,552	1	18	12
Tuckerton Borough	2,472	2,435	20	17	28
Ocean County	346,038	331,977	9,439	4,622	8,444

Note: * Persons of Spanish Origin are also counted in one of the race columns.
Source: US Bureau of the Census, Census of Population, 1980.

In terms of racial characteristics, the County remains predominantly white. In 1980, nearly 332,000 persons or 95.5 percent of the County's population were white. Of the minority population, blacks represented the largest group comprising 9,439 persons or 2.7 percent of the total population. The remaining 1.4 percent of the population represented other minority categories. The table on the preceding page presents racial characteristics by municipality for 1980.

Over 43 percent of the County's population were reported as descendent from single ancestry groups in 1980. The major single ancestry groups represented were Italian, 10.7 percent, German, 9.1 percent, Irish, 8.0 percent and English, 5.3 percent. Approximately 38 percent of the population were descended from multiple ancestry groups. In addition, less than 3 percent of the population claimed to be of Spanish origin.

HOUSING

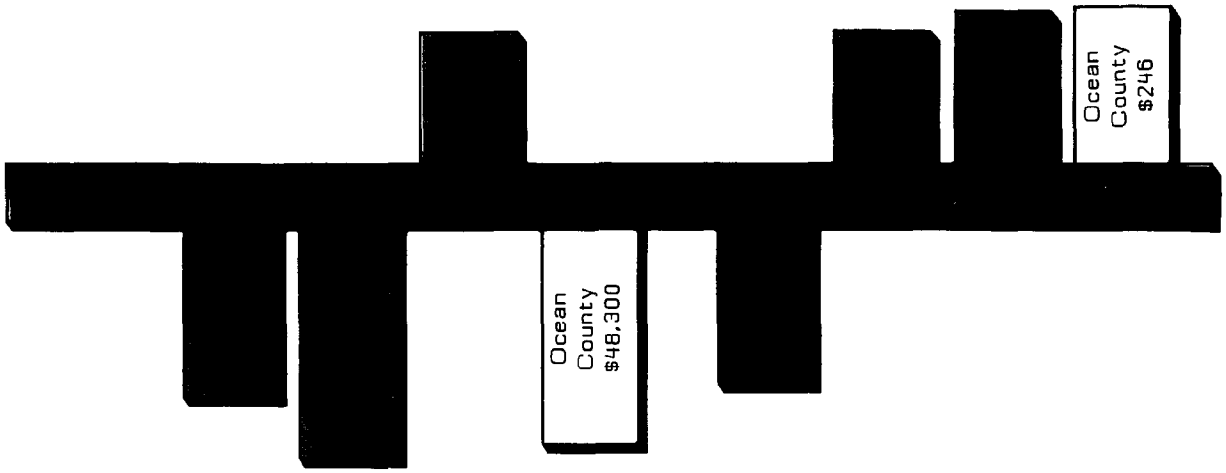
Ocean County's population growth has resulted in a tremendous increase in the County's housing stock. Since 1970, there have been 63,221 new dwelling units constructed in the County for a total housing stock of 173,532 units in 1980. Of this total, 139,979 units were year-round and 33,553 units were seasonal.

The County's housing stock is dominated by the detached single family house. This type comprised 85 percent of the year-round units for a total of 119,575 units. Duplex and multi-family units totaled an additional 16,811 units and there were 3,593 mobile home units.

Generally, year-round units in Ocean County are owner-occupied, which is consistent with the single family unit. In 1980, of the total year-round units 128,304 were occupied and 11,675 units were vacant. Of the total occupied units, 106,408 or 83 percent were owner-occupied and 21,896 units were rental. It should be noted that the 1980 vacancy rate was eight percent compared to two percent in 1970. This indicates an improvement in the availability of housing opportunities.

A strong regional housing market and the availability of relatively low cost housing in comparison to other market areas of the region have been major reasons for Ocean County's growth. In 1980 the median value of owner-occupied, noncondominium units was $48,300. This figure is 21 percent below the State median value of $61,400. Median contract rent, however was higher than the State figure in 1980. The County figure was $246 compared to the State's $228. According to figures compiled by the Rutgers University Center for Urban Policy Research, the 1985 median rent for a single family unit was $500.

Figure 2-5
Median Housing Value and Contract Rent
Ocean County and Adjacent Counties



Source: US Bureau of the Census, Census of Population and Housing, 1980.

representing an increase of 103 percent since 1980. The preceding figure presents housing values for Ocean County and adjacent counties.

It should be noted that the median value of housing for Ocean County has increased in part because of the very high value of housing throughout coastal areas. The variation in the value of housing between the coastal portion of the County and the inland region is apparent in Table 2-3 on the following page which presents detailed information on the composition of the County's housing stock.

ECONOMIC CONDITIONS

The economy of Ocean County is in transition. Long dominated by the resort and tourism industry, the economy is becoming increasingly diversified as new or expanding industrial and commercial operations develop in the County. While the resort and tourism industry is still important, and remains the County's most lucrative industry, the rapid increase in year-round population has brought about a concomitant increase in employment opportunities and economic development.

Table 2-3
Ocean County Housing Stock by Municipality, 1980

	1970	1980								
Municipality	Total Units	Total Units	Year Round Occupied	Year Round Vacant	Seasonal	Non-Condominium Units	Median Value	Condominium Units	Median Value	Rental Units	Contract Rent
Barnegat	745	3,409	2,820	482	107	1,967	$ 44,039	101	$29,542	261	$ 266
Barnegat Light	680	1,084	259	79	746	165	$ 90,068	0	0	24	$ 258
Bay Head	862	935	521	44	370	353	$ 110,212	0	0	105	$ 327
Beach Haven	1,980	2,379	760	154	1,465	436	$ 81,221	1	$ 95,000	155	$ 207
Beachwood	1,633	2,678	2,477	108	93	2,084	$ 44,918	0	0	243	$ 254
Berkeley	3,929	11,698	9,614	505	1,579	8,366	$ 45,667	6	$ 53,750	673	$ 232
Brick	14,134	22,025	18,930	1,823	1,272	2,253	$ 53,715	1,470	$ 33,226	2,987	$ 258
Dover	22,138	30,132	22,175	1,723	7,234	16,467	$ 57,213	145	$ 44,801	3,304	$ 255
Eagleswood	459	468	362	33	73	264	$ 38,603	0	0	44	$ 183
Harvey Cedars	859	1,194	167	93	936	91	$ 99,587	0	0	28	$ 261
Island Heights	658	719	576	39	104	432	$ 54,843	0	0	88	$ 235
Jackson	5,217	8,156	7,756	331	69	5,130	$ 54,275	50	$ 25,050	1,126	$ 243
Lacey	3,611	6,513	5,107	196	1,210	4,402	$ 50,478	0	0	382	$ 253
Lakehurst	815	1,050	893	151	6	460	$ 33,491	3	$ 32,500	320	$ 223
Lakewood	9,449	15,335	14,489	787	59	4,958	$ 52,749	4,534	$ 37,266	4,239	$ 228
Lavallette	2,485	2,954	916	203	1,835	536	$ 82,157	0	0	199	$ 252
Little Egg Harbor	2,926	4,958	3,145	637	1,176	2,562	$ 45,533	31	$ 50,080	310	$ 256
Long Beach	6,525	7,836	1,543	1,055	5,278	1,025	$ 90,004	0	0	200	$ 240
Manchester	3,360	14,812	13,863	676	77	7,948	$ 43,844	3,073	$ 40,690	386	$ 175
Mantoloking	429	460	184	231	45	160	$ 175,390	0	0	11	$ 329
Ocean	1,820	2,260	1,492	302	466	1,286	$ 45,924	0	0	99	$ 245
Ocean Gate	966	997	560	20	417	355	$ 39,776	0	0	149	$ 217
Pine Beach	628	790	658	36	96	518	$ 56,807	0	0	75	$ 248
Plumsted	1,362	1,657	1,564	84	9	865	$ 46,988	0	0	375	$ 196
Point Pleasant	6,283	7,253	6,551	452	240	4,760	$ 55,102	0	0	1,331	$ 277
Point Pleasant Beach	2,684	3,101	2,167	134	200	1,117	$ 65,233	0	0	805	$ 254
Seaside Heights	2,447	2,728	832	118	1,578	193	$ 53,056	3	$ 44,166	442	$ 227
Seaside Park	2,009	2,651	784	341	1,526	350	$ 74,460	0	0	208	$ 226
Ship Bottom	1,517	1,781	608	93	1,080	367	$ 70,187	0	0	103	$ 207
South Toms River	1,062	1,096	1,042	48	6	840	$ 34,941	0	0	141	$ 261
Stafford	3,178	6,567	3,789	412	2,396	2,911	$ 48,436	113	$ 37,975	383	$ 238
Surf City	2,087	2,350	709	97	1,556	417	$ 72,865	0	0	152	$ 223
Tuckerton	1,314	1,676	981	188	7	594	$ 37,405	0	0	204	$ 217
Ocean County	110,311	173,532	128,304	11,675	33,553	85,632	$ 52,771	9,530	$ 37,788	19,552	$ 244

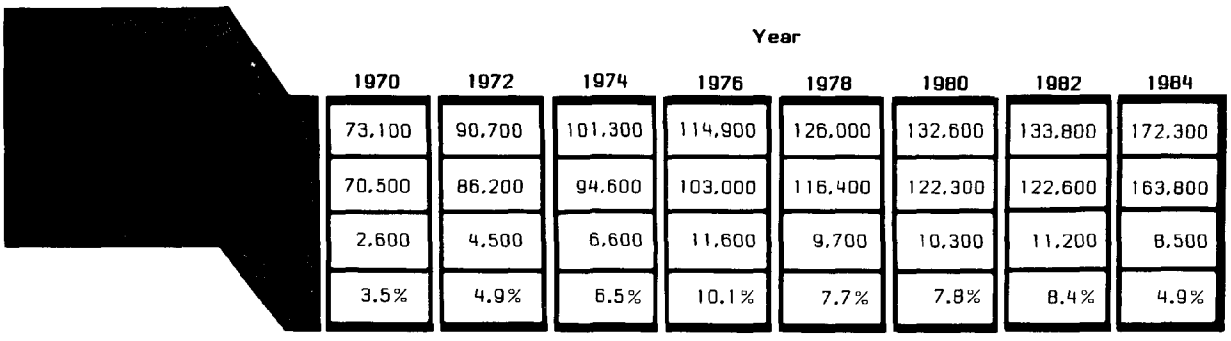
Source: US Bureau of the Census

The rapid expansion of the County's economy is best illustrated by examining the increase in the labor force. Since 1970, the labor force has increased by 82 percent, from 73,100 to 132,600 persons in 1980. By 1984, the labor force rose to 172,300 persons representing a 30 percent gain. Actual employment in the County increased by 78 percent from 42,500 jobs in 1970 to 75,121 jobs in 1980. In 1984, actual employment accounted for 89,739 jobs representing a 19 percent increase since 1980.

These figures indicate that despite the economy's expansion there are still many more workers in the County's labor force than there are local employment opportunities, requiring many residents to commute to jobs outside the County. In 1970, nearly 25,000 workers commuted to employment locations outside the County. By 1980, approximately 45,000 residents worked outside of Ocean County. Nearly 10,000 persons commuted to the New York/New Jersey metropolitan region, 17,324 residents worked in Monmouth County and 2,300 persons worked in Atlantic County.

The single largest section of the County's economy is retail and wholesale trade, accounting for 28 percent of all jobs in 1984. Trade includes both seasonal and non-seasonal retail employment and reflects in part the continued importance of tourism to the County's economy. Employment in the service industries and government, which includes public school personnel, has also expanded to meet the needs of the County's new residents.

Figure 2-6
Labor Force and Employment, 1970-1984



	Year							
	1970	1972	1974	1976	1978	1980	1982	1984
	73,100	90,700	101,300	114,900	126,000	132,600	133,800	172,300
	70,500	86,200	94,600	103,000	116,400	122,300	122,600	163,800
	2,600	4,500	6,600	11,600	9,700	10,300	11,200	8,500
	3.5%	4.9%	6.5%	10.1%	7.7%	7.8%	8.4%	4.9%

Source: NJ Department of Labor, Regional Labor Market Review, 1984.

The construction industry has employed a significant proportion of the labor force, although decreasing during the mid-1970's national recession. The bulk of construction activity has been related to new residential construction, especially multi-family projects.

In the ten year period from 1970 to 1980, Ocean County municipalities issued 63,848 building permits for new residential construction. The cost of this new construction was estimated at 2.2 billion dollars. During the following five year period from 1981 through 1985, there have been an additional 22,241 permits issued at an estimated cost of 1 billion dollars.

Persons employed in manufacturing have generally shown small but continuous increases since 1965. Products produced by major local firms include electronics, pharmaceuticals, cosmetics, chemicals and other allied products. Packaging of finished products has also emerged as an important local industry.

The concern of Ocean County and its municipalities to expand employment opportunities and provide a more balanced economic base has resulted in the formation of economic development agencies. The function of these agencies is to create a progressive climate for new industrial, corporate and professional office and commercial development. The most visable product of these efforts are the development of municipal industrial parks. These are presented in the following table.

Table 2-4
Municipal Industrial Parks in Ocean County

Location	Total Acres	Total Clients	Accepting Clients	Near Capacity	Planned
Barnegat Township					
Route 554	20	0			•
Berkeley Township					
Route 530	78	4	•		
Dover Township					
Route 37	156	20		•	
Jackson Township					
Ridgeway Area	60	2	•		
Whitesville Area	216	13		•	
Lacey Township					
Lacey Road	150	0			•
Lakewood Township					
James Street	200	13	•		
Route 70	500	71		•	
Route 70 Expansion	800	22		•	
Ocean Township					
Route 9	600	0			•
Stafford Township					
Route 72	128	0			•
County Total	2,908	145	3	4	4

Source: Ocean County Office of Economic and Industrial Development, 1986.

The industrial parks in Ocean County are well designed and located. Essential services and utilities are either currently available or are being planned. All the parks are located near major highways and those in Dover and Lakewood Townships have rail service available. These parks are intended to attract clean, light industrial concerns, offices and research and development firms that are compatible with the area's resort character and sensitive coastal environment. The industrial parks have rigid quality controls and they have been carefully designed to protect adjacent properties from potential impacts. The costs per acre are very competitive as industrial sites within the metropolitan area.

It is anticipated that major increases in employment, particularly in the manufacturing sector, will result from the continued development of these parks. In addition, service-oriented employment, both the public and private sectors will expand to meet the requirements of the rapidly increasing residential population. Conversely, traditional industries such as agriculture, fisheries and mining, which have shown stability or slight decline as major employers, are anticipated to decrease in importance.

While the County's economic climate has been generally bright there are still areas of concern. Seasonal unemployment, especially during the winter months when tourism, construction and farming activities are at a low level, continues to be a problem. While the unemployment rate from 1980 through 1983 remained steady at approximately eight percent, the employment situation has recently shown a significant improvement. The Department of Labor and Industry's 1985 labor force estimate for Ocean County showed a total labor force of 182,700 persons. The State estimated 7,600 persons were unemployed which represented a 4.2 percent unemployment rate.

Ocean County has historically been an area of low incomes. Per capita income in 1983 was $12,085, ranking the County eighteenth among New Jersey's 21 Counties and well below the State figure of $14,122. However, the County level exceeded the national income figure of $11,685. An estimate of the 1985 median family income was $23,619 which placed Ocean County nineteenth in the State. The income characteristics have generally reflected lower wage scales than the New York metropolitan labor market.

The resort and tourism sector of the County's economy is significant not only because of the employment opportunities it provides, but also because of the economic benefits derived from the thousands of seasonal visitors attracted to the area. With over 75,000 acres of public open space, 45 miles of Atlantic Ocean coastline, Barnegat Bay and hundreds of miles of streams and rivers, Ocean County has long attracted thousands of seasonal visitors each year. This seasonal influx varies by location (ocean beach or inland), community character and recreational generators as well as by day and night, weekday and weekend and by weather conditions.

It is extremely difficult to derive an accurate estimate of the number of seasonal vistors to the County or to precisely determine their effect on the economy. Several studies have been conducted which indicate the ratios of seasonal population per permanent population appearing in the table below.

Table 2-5
Ratio of Seasonal to Permanent Population

Area	Ratio
Coastal Beach Communities	10:1
Bay Communities	2:1

Source: Ocean County Concept Plan, Dames and Moore and Ocean County Planning Board, 1975.

In consideration of these studies, the Ocean County Planning Board estimates the peak day summer seasonal population of the County to range between 600,000 and 650,000 persons. This estimate includes permanent residents. The shore continues to attract the majority of the seasonal visitors who make use of the traditional ocean beach facilities; the beach, the bay, the boardwalks and the many marinas. Marinas are important centers of seasonal activity providing dockages for the commercial and sport fishing fleets, facilities for pleasure craft and related services. There are over 200 marina facilities operating in the County including several of the largest facilities on the East Coast.

Recreational facilities in the inland section are being increasingly utitlized. Canoeing, hiking and camping in the Pine Barrens are traditional and expanding activities. Family campgrounds have been constructed inland to take advantage of the County's lakes and streams. Older inland resort centers such as Lakewood have managed to retain resort status through such methods as conversions of older resort hotels to spas and to health and diet centers. Rova Farms in Jackson Township, with its unique attractiveness to members of the Russian Orthodox faith, is also popular. The largest commercial recreational use in the County is Great Adventure Amusement Park located in Jackson Township. Great Adventure includes a theme amusement park and safari park. The amusement park has become a major employer in the County during the summer when over 1,200 persons are employed.

The preceding section has briefly presented the major components of the County's economic base. In 1978, the National Council for Urban Economic Development conducted

a study of the economic development potential of the County. Their report examined the development related assets and liabilities of the County.

The major development-related assets for Ocean County include: excellent quality of life; abundant natural resources and open space; low property and business tax rates; abundant labor supply; reasonably priced housing stock; proximity to two major urban markets; regional wastewater treatment system with capacity for future growth; County airpark facility with capacity for future demand; regional shopping mall; good vocational-technical education facilities; large parcels of land available at low cost and committed public and private sector cooperation illustrated by Private Industry Council, Tourism Advisory Council and municipal industrial development commissions.

Several liabilities for development were also cited; they include; environmental constraints negatively impact development; lack of organizational capacity to plan, create policy and implement economic development strategies, high proportion of County residents are commuters; unmobilized private sector; growing elderly population requiring support facilities; inadequate roads for accommodating heavy truck traffic; lack of vertical coordination between municipal, County and state agencies; and unclear concensus on a balanced growth program.

ENVIRONMENTAL FEATURES

The Master Plan is a document that is primarily concerned with the use of land. Any plan that considers the appropriate future use of the land must be based upon a careful and complete evaluation of environmental features. Ocean County is blessed with an abundance of natural resources and physical amenities that must be preserved from inappropriate and incompatible development if the essential character of the County is to be maintained.

The County has long recognized the importance of preserving and enhancing its environmental resources. In fact, the major planning efforts of the County have had as their objective the protection of the critical natural resources and unique biological features that are prerequisites for the continuation of the quality of the environment and life in Ocean County. These major undertakings in combination comprise the extensive natural resource inventory on which this plan is based:

1. **Natural Resource Inventory For Long Beach Island.** Ocean County Planning Board, 1976.
2. **Population, Land Use and Environmental Resources.** Ocean County Areawide Water Quality Management Agency, 1978.

The **Woodmansie - Downer** association comprises 8 percent of the County. The association is approximately 70 percent Woodmansie soils, 20 percent Downer soils and 20 percent minor soils. The soils are nearly level to sloping, well drained, sandy and loamy soils on uplands.

The **Manahawkin - Atsion - Berryland** association makes up about 16 percent of the County. The association is about 35 percent Manahawkin soils, 35 percent Atsion soils, 20 percent Berryland soils and 10 percent minor soils. The soils are nearly level, very poorly drained organic and sandy soils located on lowlands.

VEGETATION

The vegetation of Ocean County can be categorized into three natural plant communities: **Upland Forest**, including pine and oak-dominated forest; **Lowland Forest**, containing white cedar, hardwood swamps and pitch pine lowland forests; and **Non-forest**, comprised of active and non-active farmland and marsh areas. The most representative vegetation is that of the New Jersey Pinelands, or Pine Barrens, which is characterized by dry, upland pine forests and dense stands of white cedars lining the stream corridors. Pinelands vegetation dominates the central and southern portions of the County and extends northward as far as Lakewood Township, gradually changing into oak-dominated forests in the northwestern townships of Plumsted and Jackson.

Pine-dominated forests are typical of the upland forests that cover large portions of Ocean County.

The **Upland Forest** type is located in areas of dry soils where the seasonal high water table is at least 1.5 feet below the surface. Generally, upland forests are either pine-dominated or oak-dominated. The dominant type of tree coverage is largely determined by two factors, soil conditions and the frequency of forest fires. Soils that are loamy with fine sand and organic matter will produce oak-dominated forests. Drier, coarse, sandy soils produce pine-dominated forests. Forests that have been burned over more than once in twenty years tend to be dominated by pines. With

some species, such as pitch pine, new growth is actually stimulated by fire. In areas where fire occurs less frequently than once in twenty years, the forest is generally dominated by oaks. As pine trees mature and die, the oak species replace them as dominants. Without fire or interference by man, the climax vegetation type would be a pure oak forest.

The pine-dominated forest has an open canopy, with trees growing distant from one another and crowns thin enough to allow considerable light to penetrate to the understory layers. The canopy trees reach a maximum of 50 to 60 feet in height. Pitch pine accounts for as much as 30 percent of the trees in this forest type. Short leaf pine, black oak, white oak, post oak, scarlet oak, chestnut oak and blackjack oak comprise the remaining 20 percent. The understory vegetation in pine-dominated forests is dense and woody. Dominant shrubs include black huckleberry, lowbush blueberry, sheep laurel, fetterbush and mountain laurel.

Blueberries, an understory shrub in the Pinelands, were first cultivated commercially by Elizabeth White in the 1800's.

A variation of the pine-oak forest is the stunted-pine or dwarf forest. This variation is found in the driest areas of coarse, sandy soils. Principal species include pitch pine, scrub oak and blackjack oak. These areas are extremely susceptible to fire and the pine and oak trees are scrubby and stunted. The trees are widely spaced and thin, creating little shade. This feature, in combination with the infertile soils, results in a sparse ground cover of lichens, mosses and dwarfed shrubs of the heath family. This sub-category of the pine-oak forest type, generally known as the dwarf forest or Plains, occurs in the extreme southwestern portion of Ocean County. Here, the dwarfed trees range only from three to ten feet in height and represent a botanically unique vegetation type.

Black huckleberry and lowbush blueberry are the most abundant shrubs in the Plains areas. Sheep laurel, mountain laurel, sweetfern and the uncommon sand myrtle are widely distributed, although they are only locally abundant. The broom crowberry, another rare plant, is also prominent in areas of the East and West Plains. Wintergreen, bearberry and trailing arbutus are also fairly widespread. The association of ground-cover plants represented by sand myrtle, broom crowberry, bearberry and pyxie moss occurs exclusively in the Pinelands.

In the oak-pine forests, scrub and blackjack oak are replaced by the larger species of oak. Other dominant species of this forest type include black, scarlet, white, chestnut and post oaks. Pitch pine and shortleaf pine are scattered among the oak canopy. In forests untouched by recent fires, mature oaks are widely spaced, but form a nearly closed canopy at an average height of 35 to 50 feet. The shrub layer consists primarily of black huckleberry, low bush blueberry and dangleberry. Less common species include staggerbush, sheep laurel, and wintergreens.

Dominant species in mature, oak-pine forests are white, black, scarlet, chestnut and northern red oaks. The northern red oak occurs primarily in the Metedeconk drainage basin and is rare in the southern part of the County. Black oak is the dominant species in southern Ocean County.

There are three basic types of **Lowland Forest** in Ocean County. The lowland forests include pitch pine lowland, hardwood swamp, and Atlantic white cedar swamp. In many cases, the pitch pine lowland forests indicate a transition zone between upland and lowland forest types. The transition is also indicated by the types of understory and shrub vegetation.

Ferns are common in areas of lowland forest which occupy poorly drained and wet soils.

The canopy of pitch pine lowland forest is almost totally dominated by pitch pine, although species of red maple, black gum and gray birch are scattered throughout. The height of the canopy reaches from 15 to 20 feet. The understory consists principally of black huckleberry, dangleberry and sheep laurel. In areas of the poorest drainage, leatherleaf fern dominates the undergrowth. Many species of shrubs, herbs, mosses and lichens found in the pitch pine lowland also occur in the upland forest types.

Hardwood swamp forests occupy the wet soils of the floodplain, frequently found between areas of cedar swamp and pitch pine lowland forest. The canopy of the hardwood swamp averages from 25 to 30 feet in height. Red maple predominates, although sweet bay, black gum, gray birch and sassafras are also present. Pitch pine and white cedar are distributed throughout the hardwood. Shrubs found in the hardwood swamp forest include sweet pepperbush, highbush blueberry, swamp azalea, leather leaf, fetterbush and black huckleberry.

The Southern, or Atlantic white cedar swamps are among the most noteworthy and characteristic species of the wet lowlands. Atlantic white cedar is found along primary flood plains and in areas of high water table along the coast. Atlantic white cedar forms dense, pure, even-aged stands with an average height of 40 to 50 feet. Pure stands have developed after severe forest fires, clearcut timber harvesting or in abandoned cranberry bogs. Seedlings are intolerant of shade, but thrive in strong sunlight.

Although Atlantic white cedar stands are relatively pure, they may often be mixed with the hardwood swamp species of red maple, black gum and sweet bay. Shrubs include leatherleaf, sheep laurel, swamp azalea, cranberry, highbush blueberry, black huckleberry, wax myrtle, dangleberry, fetterbush and bayberry. Several rare and unusual plants are associated with white cedar stands. These include the carnivorous pitcher plant, round, spatulate and thread-leaf sundews and horned bladderwort. Also found are the rare curly-grass fern, Carolina clubmoss and several species of orchids, milkworts, sedges and cotton-grass.

Pure stands of Atlantic White Cedar, such as this stand at Wells Mills, are among the most noteworthy species of the wet lowlands.

Non-forest vegetation communities can be divided into two categories. In upland areas, this includes active agricultural land and abandoned fields. In lowland or wet areas, it includes tidal and inland marshes and cranberry bogs. Certain non-forest land areas are occupied with vegetation in various stages of succession from field to forest. Over a period of time these areas will revert to upland or lowland forest.

Active agricultural land represents a valuable resource, and hedgerows between fields and ecotones, where cropland meets forest or fallow fields, provide considerable amounts of food and cover for a variety of wildlife. However, the decline in agricultural activity has resulted in the abandonment of previously active fields. Most areas of old fields or abandoned farmland occur in Plumsted and Jackson Townships. Soil types associated with these fields are principally well to moderately well drained sands, loams and loamy sands.

Farmland abandoned during the 1950's and 1960's now represents a very productive habitat. Abandoned fields support a diverse mixture of herbaceous, shrub and tree vegetation

FLORA AND FAUNA

With its vast expanses of undisturbed land and its many diverse environments, Ocean County contains habitat for many different species of plants and animals. For example, the unique vegetation of the Pinelands is that area's most distinctive feature. There are approximately 850 plant species found in the Pinelands region, and many of them are unusual and rare. Of the total plant species, 109 plants of southern affinity reach the northern limit of their range in the Pinelands, and 14 northern plants reach their extreme southern, or southernmost Coastal Plain limit, in the Pinelands. The ecosystems of the barrier beaches, the salt marsh and similar areas are equally as complicated and diverse.

The County is also the habitat for numerous species of wildlife, some of which are very rare. Important wildlife habitats include upland forests, freshwater streams and lakes, tidal wetlands and estuaries and the marine environment of the Barnegat Bay system.

The osprey, once a threatened species, has benefited from improved environmental management.

The abundance, distribution and diversity of wildlife occupying these habitats is dependent on the availability of food, water and cover. Vegetation is the primary factor influencing the availability of food and cover. In general, the more varied and dense the vegetation the greater the number of wildlife species that can be supported. Also, the habitat must cover sufficient land area to support the home range requirements of various species in order for local populations to survive.

A detailed inventory of the flora and fauna of Ocean County has been prepared as part of the County's natural resource inventory. This inventory is an important indicator of environmental quality within Ocean County. First, the comprehensive inventory provides information against which fluctuations in the population of various species can be measured. Secondly, knowledge of important species can guide management and protection efforts to preserve the critical habitat required for local populations and communities.

The need to preserve, protect and enhance a diversity of plant and animal communities as important components of the County's ecosystem is a major aspect of environmental management. Habitat degradation or destruction results in both a change in the composition

Table 2-6
Unique, Threatened or Endangered Species in Ocean County

Common Name	Scientific Name	Status
Plant Species		
American Mistletoe	Phoradenron flavescens ***	T
Awned meadow beauty	Rhexia aristosa ***	E
Barratt's sedge	Carex barrattii ***	T
Basket or chestnut oak	Quercus michauxii *	
Bog aster	Aster memoralis	
Boykin's lobelia	Lobelia Boykinii ***	E
Britton's violet	Viola brittoniana	
Broom crowberry	Corema conradii **	E
Canby's lobelia	Lobelia canbyi	T
Carolina clubmoss	Lycopodium carolinianum	
Chaffseed	Schwalbea americana ***	E
Crested yellow orchid	Habenaria cristata ***	E
Curly grass fern	Schizaea pusilla***	E
Floating heart	Nymphoides cordata***	T
Grass leaved ladies tresses	Spiranthus praecox *	
Green woodland orchid	Habenaria clavellata	
Hairy blazing star	Liatris graminfolia	
Hudsonia (Pine Barrens heather)	Hudsonia erricoides	
Humped bladderwort	Utricularia gibba ***	T
Japanese sedge	Carex Kobomugi	
Knieskern's beaked rush	Rhynchospora knieskernii	T
Little ladies tresses	Spiranthes tuberoso ***	T
Loesel's twayblade	Liparis loeselli ***	E
Longlipped twayblade	Listeria australio *	E
Maryland milkwort	Polygala mariana ***	T
New Jersey rush	Juncus caesariensis ***	T
Pickering's morning glory	Breweria pickeringii ***	T
Pine Barrens gentian	Gentiana autumnalis ***	E
Pine Barrens goldenrod	Solidago fistulosa	
Pine Barrens reedgrass	Calmovilfa brevipilis	T
Pine Barrens or slender rattlesnake root	Prenanthes automnalis **	E
Purple bladderwort	Utricularia purpurea *	T
Pyxie Moss	Pyxianthesa barbulata	
Ragged fringed orchid	Habenaria lacera	
Red milkweed	Asclepias rubra **	T
Resinous boneset	Eupatorium resinosum ***	T
Rose-colored tickseed	Coreopsis rosea ***	T
Sand myrtle	Leiophyllum buxifolium	
Sclerolepis	Sclerolepis uniflora ***	T
Sea beach sandwort	Arenaria peploides **	
Seaside arrowgrass	Triglochin maritima **	
Seaside spurge	Eurphorbia polygonifolia *	
Sickle-leaved golden aster	Chrysopsis falcata ***	T
Silvery aster	Aster concolor ***	T
Slender beaked rush	Rhynchospora inundata ***	T
Slender rattlesnake root	Prenanthes autumnalis ***	E
Stiff tick trefoil	Desmodium strictum ***	T
Small cranberry	Vaccinium oxycoccos *	

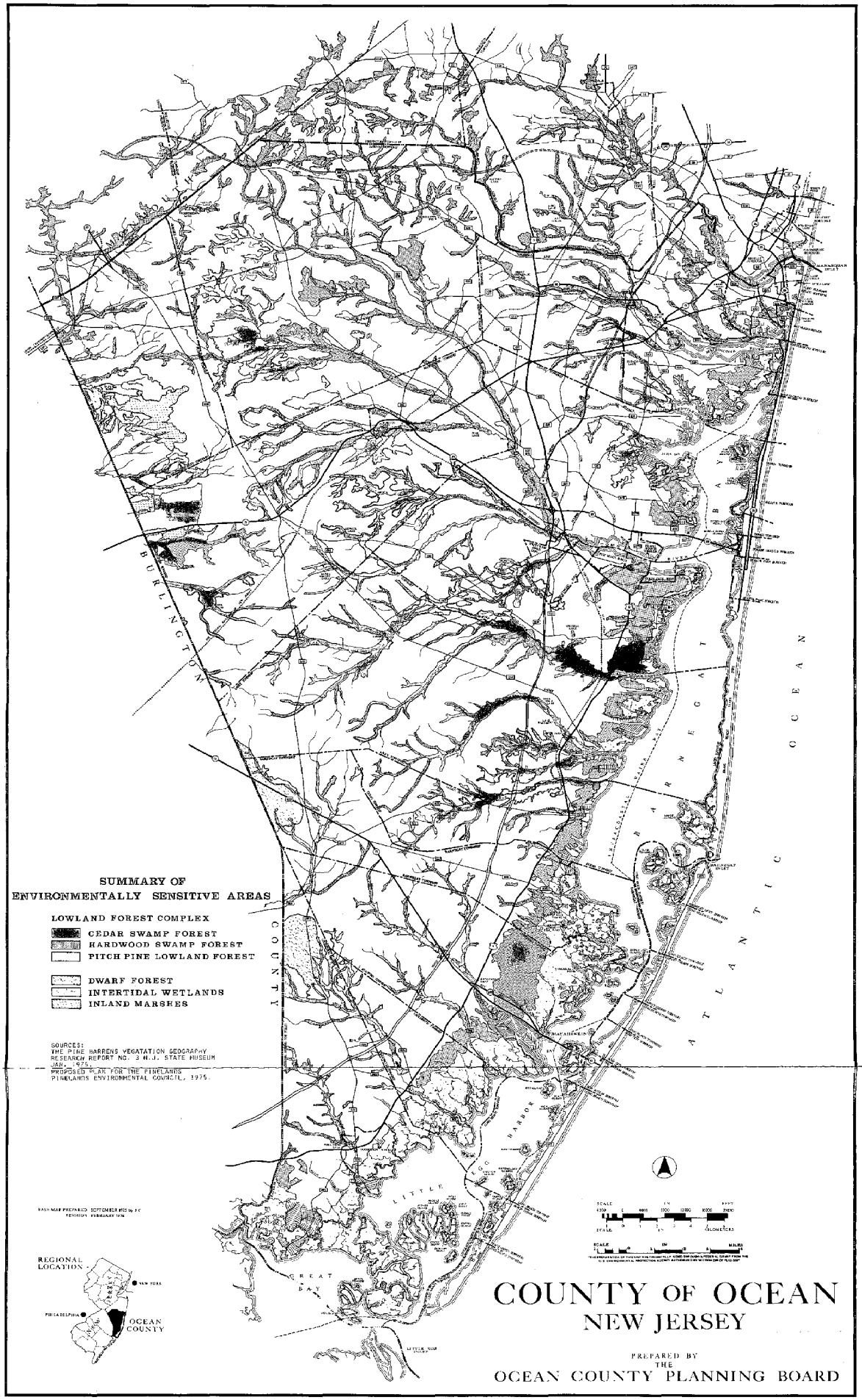
Table 2-6

Unique, Threatened or Endangered Species in Ocean County (Continued)

Common Name	Scientific Name	Status
Plant Species (Continued)		
Southern yellow orchid	Habenaria integra***	E
Swamp Pink	Melonias bullata *	
Tall rattlesnake master	Eryngium yuccifolium	
Ten angled pipewort	Eriocaulon decangulare	
Turkey beard	Xerophyllm asphodeloides	
Wand-like golden rod	Solidago stricta***	E
Wild wormwood	Artemisia caudata	
Yellow asphodel	Narthecium americanum ***	T
Yellow-eyed grass	Xyris flexuosa ***	T
Yellow fringed orchid	Habenania ciliaris **	E
Reptiles and Amphibians		
Corn snake	Elaphe guttata ****	E
Northern Pine snake	Pituophis m. melanole *	T
Timber rattlesnake	Crotalush horridus ****	E
Eastern tiger salamander	Ambystomat tigrinum ****	E
Eastern mud salamander	Pseudotriton montanus ****	T
Pine Barrens treefrog	Hyla andrersoni ****	E
Wood turtle	Clemmys unsculpta ****	T
Bog turtle	Clemmys muhlenbergi ****	E
Birds		
Bald Eagle	Haliaeetus leucocephal ****	E
Peregrine falcon	Falco peregrinus ****	E
Osprey	Pandion haliaetus ****	T
Cooper's hawk	Accipiter cooperii ****	E
Least Tern	Sterna albifrons ****	E
Black skimmer	Rhynchops niger ****	E
Pied-billed grebe	Podilymbus podiceps ****	E
Red-shouldered hawk	Buteo lineatus ***	T
Great blue heron	Ardea herodias ****	T
Short eared owl	Asio flammeus	
Red-headed woodpecker	Melanerpes erythrocephalsu ****	T
Cliff swallow	Petrocheliodon pyrrhonota ****	E
Bobolink	Dolichonyx oryzivorus ****	T
Ipswich sparrow	Passerculus sandwichensis princeps****	T
Savannah sparrow	Passerculus sandwichensis ****	T
Grasshopper sparrow	Ammondramus sauannarum****	T
Vesper sparrow	Pooecetes gramineus	E

Note: (E) endangered; (T) threatened as designated by specified agency.

Sources:
*Fairbrothers, Rare Listing; 1973.
**Fairbrothers, Endangered Listing; 1973.
***Pinelands Commission, Pinelands Comprehensive Management Plan; 1980.
****Indigenous Nongame and Endangered Wildlife Species of New Jersey (NJSA 7:25 - 4.17); 1985.
A. Morton Cooper, Ocean County Environmental Agency; 1982.


BURLINGTON COUNTY
ATLANTIC OCEAN
BARNEGAT BAY
LITTLE EGG HARBOR
GREAT BAY
SUMMARY OF
ENVIRONMENTALLY SENSITIVE AREAS
LOWLAND FOREST COMPLEX
CEDAR SWAMP FOREST
HARDWOOD SWAMP FOREST
PITCH PINE LOWLAND FOREST
DWARF FOREST
INTERTIDAL WETLANDS
INLAND MARSHES
SOURCES:
THE PINE BARRENS VEGATATION GEOGRAPHY
RESEARCH REPORT NO. 3 N.J. STATE MUSEUM
JAN., 1975.
PROPOSED PLAN FOR THE PINELANDS
PINELANDS ENVIRONMENTAL COUNCIL, 1975.
BASE MAP PREPARED SEPTEMBER 1975 by P.C.
REVISION FEBRUARY 1976
REGIONAL
LOCATION
NEW YORK
PHILADELPHIA
OCEAN
COUNTY
SCALE
KILOMETERS
SCALE
MILES
COUNTY OF OCEAN
NEW JERSEY
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of flora and fauna, and in a decline in population and possible extirpation of some species. Particularly sensitive to habitat change are those species considered as endangered or threatened by the State or Federal government. Particular care must be taken to ensure the integrity of critical habitat for those species which appear in Table 2-6.

SUMMARY OF ENVIRONMENTALLY SENSITIVE AREAS

Vegetation and soil types are frequently important indicators of critical natural resources and unique biological features that should be protected from inappropriate land uses or disturbance. The map on the preceding page delineates sensitive areas which are based on an assessment of surficial features. It should be noted that the map of environmentally sensitive areas is generalized because of scale limitations, and areas less than 40 acres are not shown. It is necessary, therefore, to conduct on-site investigations to verify the absence or presence of sensitive resources on a particular site. The map delineates areas of lowland forest types that were previously described in the section on vegetation. These include the pitch pine lowland, hardwood swamp and Atlantic white cedar swamps. Also, inland and coastal wetlands are shown.

Ocean County contains over 3,000 acres of dwarf forest, or Plains, a unique vegetative type found in the Pine Barrens.

Uniquely sensitive areas that are also delineated are the dwarf forests, also called the pygmy forests or the Plains. This unusual vegetation type consists primarily of dwarfed pitch pine and blackjack oak generally ranging from three to ten feet in height. The total area of Plains vegetation in Southern New Jersey is estimated as being 12,000 to 14,000 acres. Approximately 3,450 acres of Plains are located within Ocean County. There are two principal areas of dwarf forest in Ocean County, the East Plains and West Plains. Portions of the East and West Plains are situated in Lacey, Barnegat, Stafford and Little Egg Harbor Townships.

The unique condition of the dwarf forest has attracted much scientific attention. There are several theories regarding its origin. The chemical constituents of the soil, insect pests, fire, soil exposure and soil infertility have been considered as major factors responsible for the dwarf forest. Current theories revolve around the extreme permeability

of the soils. These soils transmit water rapidly away from the ground surface, leaving soil and vegetation extremely dry and susceptible to fires. Only the stunted, mulitple-stemmed trees of the dwarf forest are able to withstand the high frequency of fires in the Plains. Forest fires are estimated to occur about three times more frequently in the Plains than in other parts of the Pinelands region.

The permeable soils of the Plains make this location a prime recharge area for the water table aquifer. A physical factor discouraging disruption of this scientifically valuable area is the dry, infertile soils which would hinder the establishment of vegetative cover and landscaping. A more important factor is the high frequency of forest fires, which would threaten lives and property. Since fire is most likely a causative factor in the evolution and maintenance of the Plains, alteration of the natural forest fire patterns could change the character of this unique vegetation.

WATER RESOURCES AND SUPPLY

Water is perhaps the most important of the basic natural resources. The quantity and quality of an area's water resources reflect the caliber of its environment and greatly influence the extent of man's activities. Ocean County has an abundance of high-quality surface and groundwater resources. The exploitation of these resources has been a significant influence on the past growth and development of the County, and will play an increasingly important role in the future.

The County's surface water resources are comprised of both fresh and saline water bodies. Ocean County contains all or part of 29 major and minor drainage basins. The largest basin in Ocean County is the Toms River Basin which encompasses 167 square miles. The second largest basin is the Metedeconk covering 54 square miles. All but two basins drain to the Atlantic Ocean. A portion of the Crosswicks - Rancocas Creek Basin in northwestern Plumsted Township and the eastern reaches of Mount Misery Brook in the southern portion of the County drain to the Delaware River.

Rivers and streams in Ocean County are dendritic with stream flow derived in large part from base flow discharge from the groundwater table. This discharge is particularly important during periods of little or no precipitation. While river and stream beds are generally narrow, flood plains are typically very wide and stream flow velocity is relatively slow due to the flat topography. The following table displays flow values for several area rivers.

The present water quality of Ocean County rivers and streams is generally superior to that of many other New Jersey waterways. Stream water is generally soft, as the

geological deposits drained are low in calcium and magnesium and high in sodium and potassium. Nutrient levels are low in comparison to most New Jersey streams and turbidity is fairly low. Streams are further characterized by high natural acidity, particularly in white cedar swamps where decomposing vegetation and a thick humus layer contribute substantial organic acids. This factor results in the water being "tea colored" which is characteristic of Pinelands streams.

Table 2-7
Flow Values for Selected Rivers in Ocean County

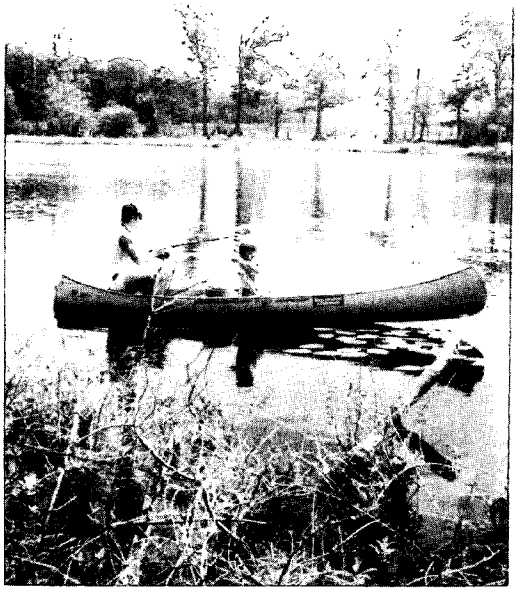
River and Location	Average Discharge (cubic feet/sec)	Peak (ft3/sec)	Year of Peak Flow	Number of Year Avg.
Manasquan River Monmouth County. (50' upstream Rt. 547)	75.9	2,940	1938	53
N. Branch Metedeconk Lakewood-Brick Townships. (Route 549)	65.4	1,370	1977	12
Toms River Dover Township. (1.9 miles downstream of Union Branch)	217.0	2,000	1938	56
Oyster Creek Lacey-Ocean Twps., (100' upstream Route 532)	28.7	352	1984	19
Westecunk Creek Eagleswood Township. (near Garden State Parkway)	34.1	256	1978	11

Source: US Geological Survey, Water Data Report NJ-84-1: Water Resource Data, New Jersey, Water Year 1984, Volume 1, 1985.

The Ocean County Areawide Water Quality Management Program established a comprehensive ambient surface water monitoring program in 1976. This program, maintained by the Ocean County Board of Health, analyzes 21 parameters of water quality at 57 monitoring stations located on all of the County's major rivers and tributaries. Data from this program through 1978 was analyzed using the Statistical Analysis System computer program in 1980. The results of this assessment on a stream segment basis are presented in the Areawide WQMP's Surface Water Quality Assessment Addendum.

The findings of this study show that the overall water quality of the County remains high. Most stream segments exhibit quality characteristics that exceed standards promolgated by the NJ Department of Environmental Protection. Since State standards for tested parameters are below observed characteristics, the study also ranked the County's streams in comparison to each other as a guide to water quality within the County. The study ranked stream segments as either above average, average or below average in comparison to average quality characteristics for water quality. Of the fifty-seven stream segments, fifteen were found to have higher levels of fecal coliform than the County average, eight were found to have high levels of nutrients such as phosphorus, nitrogen and BOD and eight had dissolved oxygen levels lower than the County average. These segments are of concern even though they generally achieve State standards because they exceed natural characteristics.

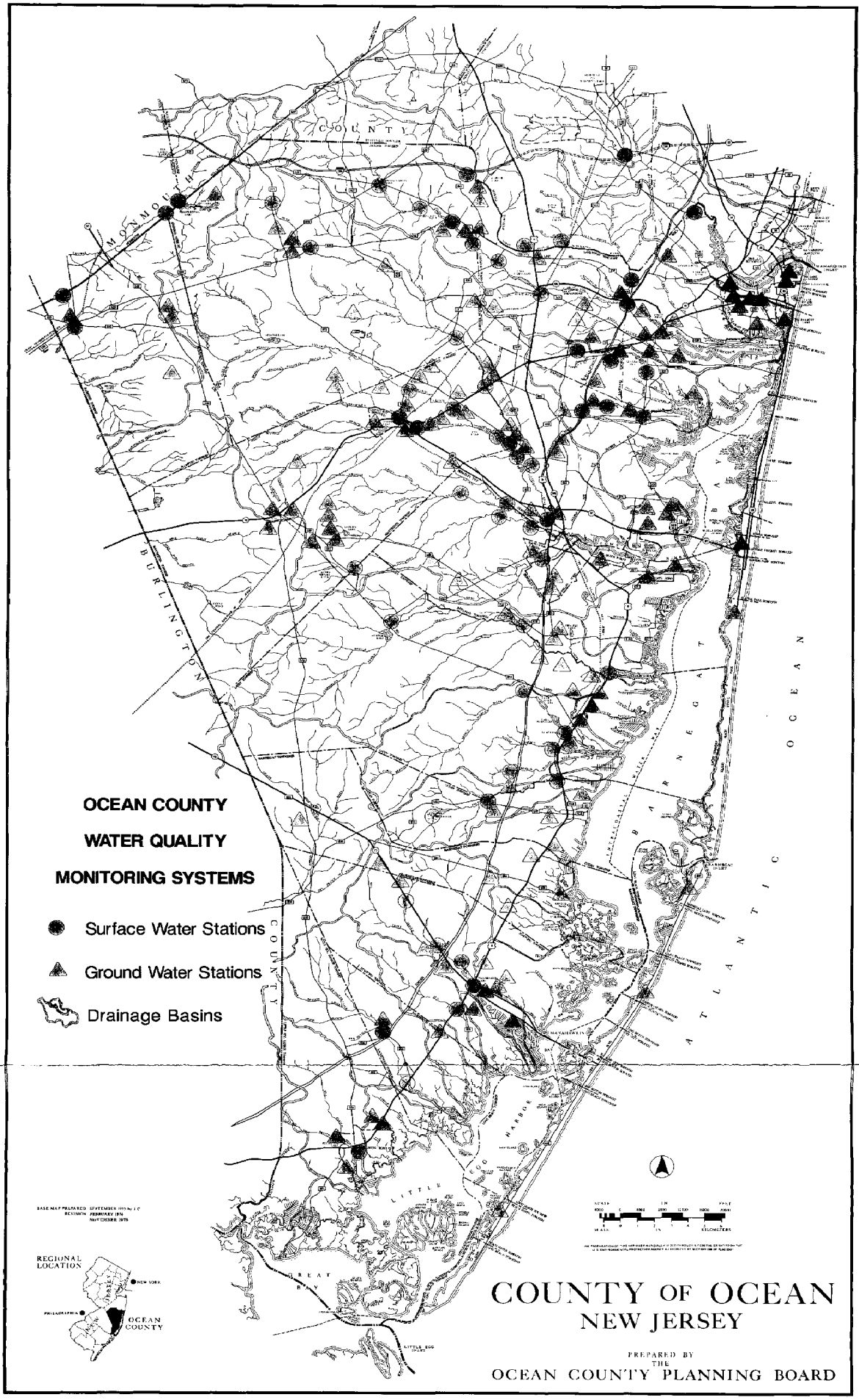
The majority of the stream segments found to exhibit characteristics below the County average are located in the more developed northern and western portions of the County. Stream segments exhibiting below average water quality for all parameters are summarized in the following table. The probable cause of the water quality degradation is also presented. The station numbers refer to the sampling locations on the map entitled Ocean County Water Quality Monitoring Systems.



The County's high quality streams and lakes are an environmental and recreational resource.

There are over 50 lakes and ponds, both natural and man-made, within Ocean County. Many ponds result from natural impoundments while others were formed by dams built to supply power to mills in the 18th and 19th centuries. The largest lake is Prospertown Lake, which covers 103.2 acres. Lake Shenandoah and Turn Mill Pond are the next largest at 101 and 100 acres respectively. The flat topography of the County results in long detention time periods for water flow through the lakes. This permits the deposition of silt and sediment, resulting in shallow lake depths.

Water quality of lakes and ponds are greatly influenced by surrounding land uses. The shores of many lakes in Ocean County have been developed and their quality is impacted by the discharge of storm drains, surface runoff and seepage from domestic septic systems. Siltation and sedimentation, runoff and other sources of degradation in combination with



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characteristic long detention times have caused eutrification problems in some County lakes and ponds. Conversely, lakes in undeveloped areas of the County such as the Pinelands are generally of high quality.

Table 2-8
Stream Segments with all Parameters Below County Average

Station Number	Stream	Probable Cause
3	Metedeconk, North Branch	Agricultural Runoff, Urban Runoff.
4	Metedeconk, North Branch	Urban Runoff, Sewage Treatment Plant discharge.
6	Metedeconk, North Branch	Agricultural Runoff.
14	North Branch, Kettle Creek	Urban Runoff.
18	Polhemus Branch, Kettle Creek	Inefficient Septic Systems, Closed Landfill.
22	Crosswicks Creek	Urban Runoff, Oakford Lake Eutrification.
23	Crosswicks Creek	Agricultural Runoff, Urban Runoff.
30	Toms River	Inefficient Septic Systems, Possible Point Source.
31	Toms River	Inefficient Septic Systems, Possible Point Source.
42	Manapaqua Brook	Urban Runoff, Two Sewage Treatment Plant Discharges.

Source: Surface Water Quality Assessment Addendum, Ocean County Areawide Water Quality Management Plan, 1982.

Ocean County is separated from the Atlantic Ocean by two barrier beach areas, Island Beach and Long Beach Island. These landforms enclose broad, shallow back bays which extend the length of the County. Barnegat Bay is the largest of the bay systems extending approximately 30 miles in length and covering 64.5 square miles. Other principal bays include Little Egg Harbor, 20.5 square miles; Great Bay, 7.6 square miles; and, Manahawkin Bay, 3.6 square miles. The bays are generally shallow. Tidal variation within the bays is relatively low due to their wide, shallow configuration and limited access to the Atlantic Ocean. The tidal range in upper Barnegat Bay is 0.6 to 0.8 feet. Tidal circulation is restricted, so that a period of approximately five days is required for a complete flushing of the bay.

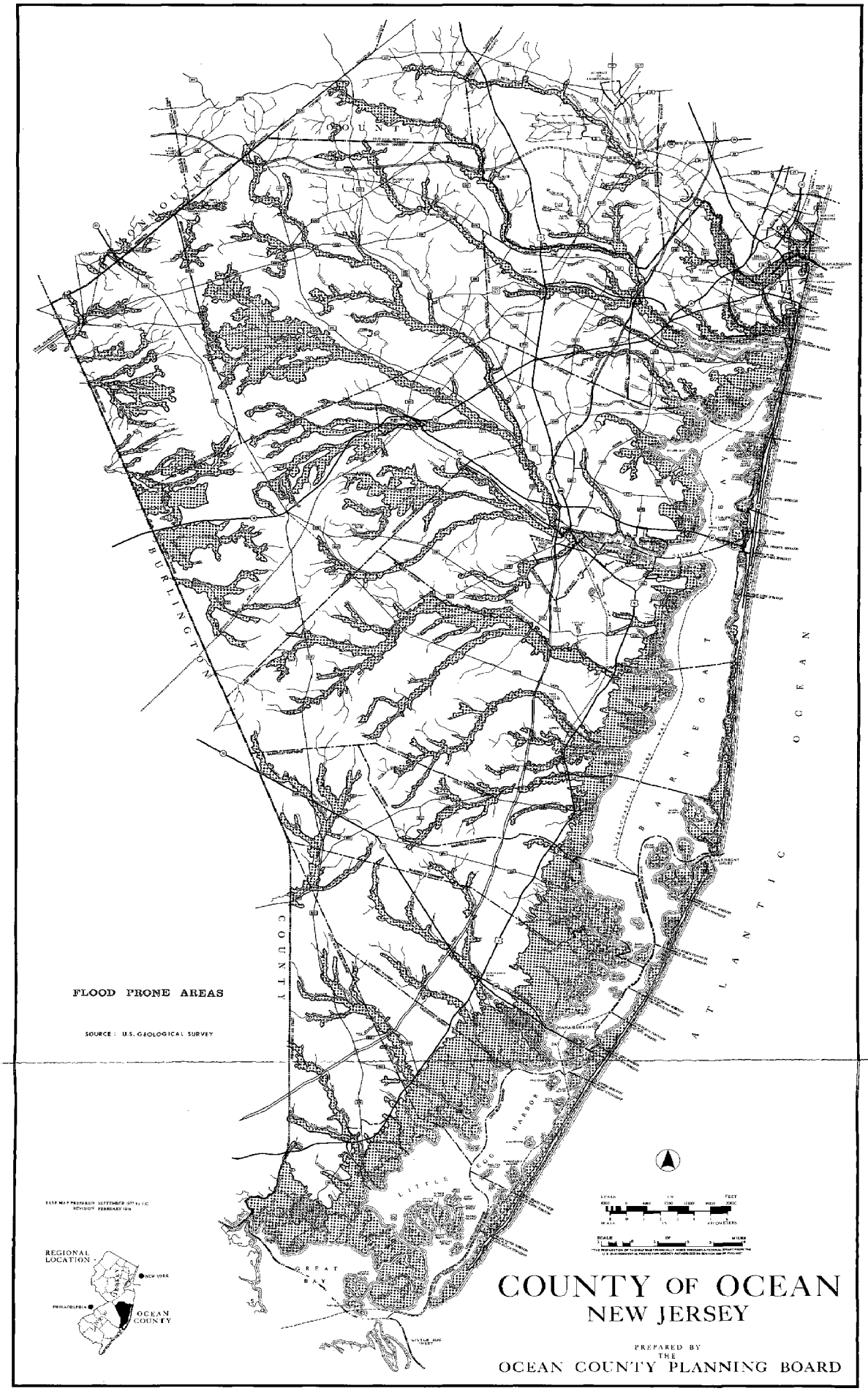
The bays are the benchmark of water quality in Ocean County. Over 400 square miles of land area drain to the bays, with a mean flow rate of approximately 360 cubic feet per second. The quality of the bays as esturine areas for recreational activities and as breeding and habitat areas for a variety of flora and fauna is dependent on the supply of clean, fresh water. Water exchange with the Atlantic Ocean is minimal and the slow flushing periods make the bays very susceptible to high nutrient levels. The bays are also susceptible to reduced stream flows which could alter the salinity gradients of the estuaries, altering aquatic nursery and spawning areas and disrupting circulation patterns.

Flooding in Ocean County normally occurs as a result of unusually heavy or prolonged rainfall. These severe weather conditions can be caused by the more common "northeaster" storms or less frequently by hurricanes. During the hurricane season Ocean County may be affected by storms occuring south of New Jersey. These events produce the most severe storms. Apart from causing riverine flooding due to heavy precipitation, tropical storms also result in unusually high tides. When heavy discharge from local streams coincides with the high tide stage of the bays, flooding is aggravated. For example, high tides in the Atlantic Ocean can affect flooding of the Toms River from its mouth on Barnegat Bay to a point approximately four miles upstream.

The 1962 storm caused extensive damage, underscoring the need to maintain the dune systems.

The severity of flood damages can be affected by the intensity and nature of development in flood-prone areas and by natural or man-made obstructions occurring within the stream channel. Flood intensity can be further influenced by development within the flood plain. The placing of fill in a flood-prone area can cause the natural floodwater level to rise in order to regain lost storage capacity. Impervious surfaces, which reduce infiltration of precipitation, can also augment flooding by increasing stormwater runoff.

Areas within a designated flood plain are protected by the New Jersey Flood Plains Act. However, in Ocean County only portions of the Cedar Creek, Toms River, Union Branch, Ridgeway Branch and Long Swamp Creek have been delineated. In the absence of the required designation studies by the State, the 100 year flood-prone area has been


MONMOUTH COUNTY
BURLINGTON COUNTY
ATLANTIC OCEAN
BARNEGAT BAY
TOMS RIVER
LITTLE EGG HARBOR
GREAT BAY
FLOOD PRONE AREAS
SOURCE : U.S. GEOLOGICAL SURVEY
REGIONAL LOCATION
NEW YORK
PHILADELPHIA
OCEAN COUNTY
COUNTY OF OCEAN
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delineated by the US Geological Study based upon topographic and hydrologic data. In coastal areas, the US Army Corps of Engineers estimated the height of a 100 year tidal event as 6.6 feet, mean sea level datum. A map of flood-prone areas appears on the preceding page.

Several of the County's rivers and streams exhibit outstanding scenic qualities and virtually pristine water quality conditions. Perhaps best known is the Cedar Creek, which was one of two New Jersey rivers first considered for inclusion in New Jersey's Wild and Scenic Rivers System. The portion of the studies of the Cedar Creek from Bamber Lake to the Garden State Parkway have been completed by the State. It is probable that this section will be designated a Wild and Scenic River. The portion of the Cedar Creek from Bamber Lake to its headwaters and its major tributaries are also being studied.

In addition to the Cedar Creek, the Pinelands Commission has determined that the following Ocean County rivers are of special significance to the Pinelands. All structures within 1,000 feet of the center line of these rivers must be designed to avoid visual impacts as viewed from the river under the resource management requirements of the Pinelands Comprehensive Management Plan.

1. **Cedar Creek** - from the Route 9 crossing, Berkeley and Lacey Townships to the Bamber Lake Dam, Lacey Township.
2. **Toms River** - from the Central Railroad of New Jersey Bridge, Dover Township to Route 528, Jackson Township.
3. **North Branch of the Forked River** - from the Garden State Parkway, Lacey Township to the confluence with Cave Cabin Branch, Lacey Township.

GROUNDWATER RESOURCES

Groundwater is an essential element of the County's water resources. Wells, both public and private, supply virtually all of the County's potable water. Also, since rivers and streams in Ocean County are dendritic, groundwater discharge is critical to the maintenance of base flow. This base flow is important for water quality considerations, aesthetic and recreational values and in the maintenance of the productivity of the County's esturine systems.

The groundwater system within Ocean County is part of the larger system underlying the entire New Jersey Coastal Plain. The sediments comprising the system are composed of alternating sequences of unconsolidated gravel, sand, silt and clay ranging in age from Cretaceous to Quaternary. The deposits generally strike in a northwest - southwest

direction and dip gradually to the southeast, forming a seaward - thickening wedge. The wedge is approximately 1,100 feet thick in the New Egypt area of Plumsted Township. This increases to approximately 4,800 feet in Tuckerton.

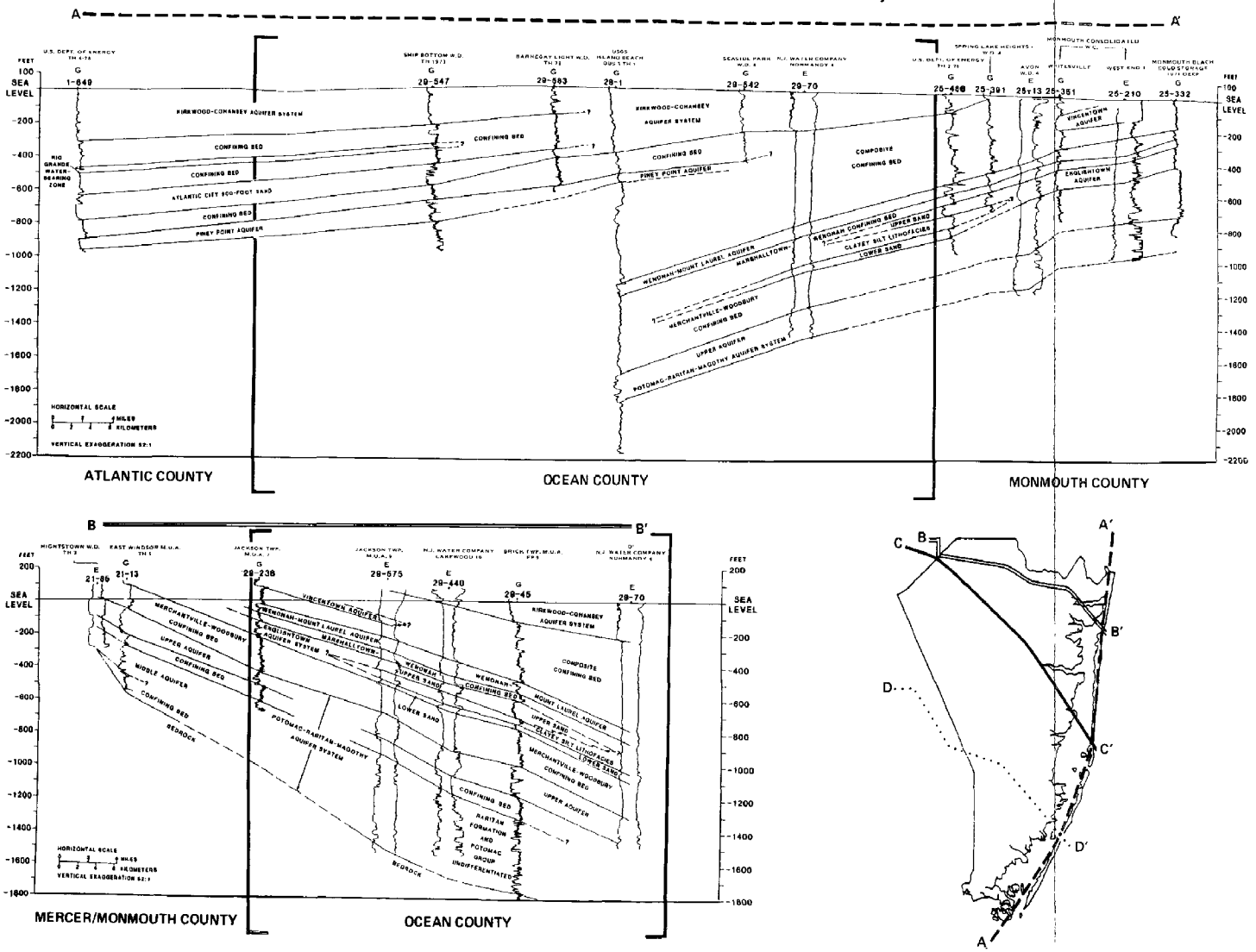
Precipitation is the source of all non-saline groundwater in the County. Approximately forty percent of the forty-five inches of average annual rainfall is recharged to the groundwater table. Precipitation that enters the ground is retained in aquifers, porous underground strata. Aquifers in Ocean County are comprised of coastal plain sediments, usually sand or gravel, which are bounded by layers of impervious clay. Surface water enters a specific aquifer at recharge areas where the sediments comprising the aquifer outcrop at the surface. Water leaves the aquifer by way of springs at or near the surface, discharge to surface water bodies or by well withdrawals. It can also leave one aquifer and enter another where the dividing clay barriers are weak or intermittent. Aquifers in Ocean County have an estimated storage capacity of 180 billion gallons of water.

The water table aquifer is the **Kirkwood - Cohansey aquifer system**, which is composed of hydraulically connected sediments of the Kirkwood Formation, Cohansey Sand and younger overlying surficial deposits. Seven aquifers underly the Kirkwood - Cohansey system. They are, in order of increasing depth and age the **Rio Grande water-bearing zone, Atlantic City 800 Foot Sand, Piney Point** or **Manasquan formation, Vincentown aquifer, Wenonah - Mt. Laurel aquifer, Englishtown aquifer** and the **Potomac - Raritan - Magothy aquifer systems.** The figures on the following pages present the stratigraphic relationships between the major aquifers and confining beds.

Potable water in Ocean County is drawn from each of the major aquifers underlying the County. It is estimated that 66 percent of the County's population is served by water systems, either public or private, and the remaining 34 percent rely on on-site domestic wells. The most heavily utilized aquifers for water supply are the Cohansey Sand and the Kirkwood Formation. The Potomac - Raritan - Magothy system is frequently utilized by major purveyors, particularly in the northeastern portion of the County. Other aquifers tapped to a lesser extent include the Englishtown, Wenonah - Mt. Laurel, Vincentown, Piney Point and the Atlantic City 800 Foot Sand. The geologic formations and their geohydrologic characteristics are presented in Table 2-10.

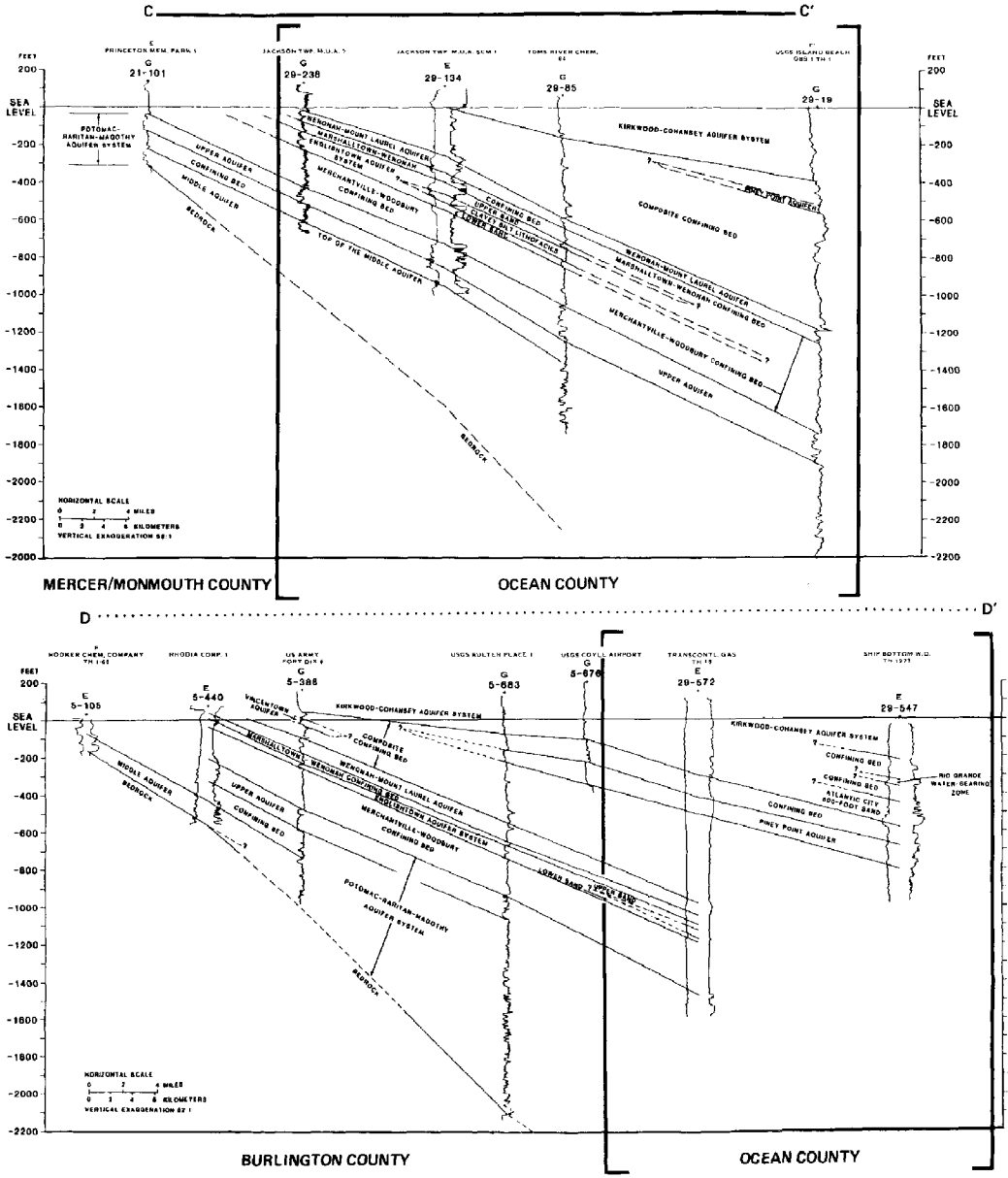
The use of groundwater for water supply and other human uses has increased substantially. Groundwater withdrawals in Ocean County have increased from 5 million gallons per day (MGD) in 1956 to 45 MGD in 1980. The potential withdrawal of groundwater, reflected in total maximum permitted diversions issued by the NJ Department of Environmental Protection has also risen. Permitted diversions have increased from 84.4 MGD in 1976 to 105.8 MGD in 1986.

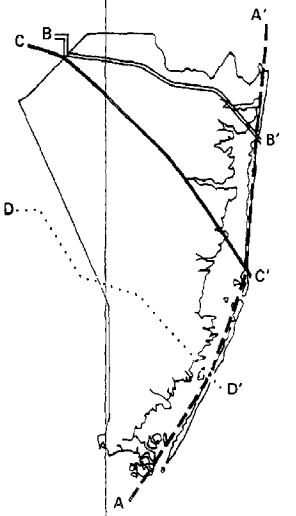
Figure 2-10
Hydrogeologic Cross-sections of Coastal and Northern Ocean County



Source: US Geological Survey, Hydrogeologic Framework of the New Jersey Coastal Plain, 1984.

Figure 2-11
Hydrogeologic Cross-sections of Central and Southern Ocean County





Source:

US Geological Survey, Hydrogeologic Framework of the New Jersey Coastal Plain, 1984.

Table 2-9
Stratigraphic and Hydrologic Characteristics of Geologic Units of the New Jersey Coastal Plain

System	Series	Geologic Unit	Lithology	Hydrogeologic Unit	Hydrologic Characteristics
Quaternary	Holocene	Alluvial deposits	Sand, silt, and black mud.	Undifferentiated	Surficial material, often hydraulically connected to underlying aquifers. Locally some units may act as confining beds. Thicker sands are capable of yielding large quantities of water.
		Beach sand and gravel	Sand, quartz, light-colored, medium to coarse-grained, pebbly.		
	Pleistocene	Cape May Formation	Sand, quartz, light-colored, heterogeneous, clayey, pebbly.		
Tertiary	Miocene	Pensauken Formation			
		Bridgeton Formation			
		Beacon Hill Gravel	Sand, quartz, light-colored, sandy.		
		Cohansey Sand	Sand, quartz, light-colored, medium to coarse-grained, pebbly; local clay beds.	Kirkwood-Cohansey aquifer system	A major aquifer system. Ground-water occurs generally under water-table conditions. In Cape May County the Cohansey Sand is under artesian conditions.
		Kirkwood Formation	Sand, quartz, gray and tan, very fine to medium-grained, micaceous, and dark-colored diatomaceous clay.	confining bed	Thick diatomaceous clay bed occurs along coast and for a short distrance inland. A thin water-bearing sand occurs within the middle of the unit.
				Rio Grande w-bz[1]	
				confining bed	
				Atlantic City 800-foot sand	A major aquifer along the coast.
	Eocene	Piney Point Formation	Sand, quartz and glauconite, fine to coarse-grained.	Composite confining bed	Alloway Clay member or equivalent.
				Piney Point aquifer	Yields moderate quantities of water locally.
		Shark River Formation	Clay, silty and sandy, glauconitic, green, gray and brown, fine-grained quartz sand.		Poorly permeable sediments.
		Manasquan Formation			
	Paleocene	Vincentown Formation	Sand, quartz, gray and green, fine to coarse-grained, glauconitic and brown clayey, very fossiliterous, glauconite and quartz calcerenite.	Vincentown aquifer	Yields small to moderate quantities of water in and near its outcrop area.
		Hornerstown Sand	Sand, clayey, glauconitic, dark green, fine- to coarse-grained.		Poorly permeable sediments.
Cretaceous	Upper Cretaceous	Tinton Sand	Sand, quartz, and glauconite, brown and gray, fine-to coarse-grained, clayey, micaceous.		
		Red Bank Sand		Red Bank sand	
		Navesink Formation	Sand, clayey, silty, glauconitic, green and black, medium-to coarse-grained.		
		Mount Laurel Sand	Sand, quartz, brown and gray, fine-to coarse-grained, slightly glauconitic.	Wenonah-Mount Laurel aquifer	A major aquifer.
		Wenonah Formation	Sand, very fine-to fine-grained, gray and brown, silty, slightly glauconitic.		
		Marshalltown Formation	Clay, silty, dark greenish gray, glauconitic quartz sand.	Marshalltown-Wenonah confining bed	A leaky confining bed.
		Englishtown Formation	Sand, quartz, tan and gray, fine-to medium-grained; local clay beds.	Englishtown aquifer system	A major aquifer. Two sand units in Monmouth and Ocean Counties.
		Woodbury Clay	Clay, gray and black, micaceous silt.	Merchantville-Woodbury confining bed	A major confining bed. Locally the Merchantville Fm. may contain a thin water-bearing sand.
		Merchantville Formation	Clay, glauconitic, micaceous, gray and black; locally very fine-grained quartz and glauconitic sand.		
		Magothy Formation	Sand, quartz, light-gray, fine-to coarse-grained; local beds of dark-gray lignitic clay.	Potomac-Raritan Magothy aquifer system: upper aquifer	A major aquifer system. In the northern Coastal Plain the upper aquifer is equivalent to the Old Bridge aquifer and the middle aquifer is the equivalent of the Farrington aquifer. In the Dela. River Valley three aquifers are recognized. In the deeper subsurface, units below the upper aquifer are undifferentiated.
		Raritan Formation	Sand, quartz, light-gray, fine-to coarse-grained, pebbly, arkosic, red, white and variegated clay.	conf bd; middle aquifer; conf bd	
	Lower Cretaceous	Potomac Group	Alternating clay, silt, sand, and gravel.	lower aquifer	
Pre-Cretaceous		Bedrock	Precambrian and lower Paleozoic crystalline rocks, metamprphic schist and gneiss; locally Triassic basalt, sandstone and shale.	Bedrock confining bed	No wells obtain water from these consolidated rocks, except along Fall Line

[1] Rio Grande water-bearing zone.

[2] ——— Minor aquifer

Source: US Geologic Survey and NJ Department of Environmental Protection, Water Levels in Major Artesian Aquifers of the New Jersey Coastal Plain, 1983, 1988.

The water level of the **Kirkwood - Cohansey aquifer system** lies near the surface throughout most of Ocean County. As a result, it is the most vulnerable to contamination from land based activities such as landfills, accidental spills, illegal dumping and faulty septic systems. The Kirkwood - Cohansey has also been the most widely used aquifer in Ocean County, supplying 16.1 MGD in 1980. As a result, this aquifer was extensively tested by the US Geological Survey in the early 1980's. The results of this sampling have indicated that it is more chemically variable than any of the other aquifers, sometimes containing high levels of dissolved solids, chlorides, nitrates, iron and manganese at various locations. It is also the most acidic of any of the aquifers underlying Ocean County.

The type of land use throughout Ocean County has been shown to influence the chemical concentration of the water in the Kirkwood - Cohansey system. Water beneath land used for commercial or industrial purposes contained higher levels of dissolved calcium. Beneath residential land, the water was often characterized by increased levels of magnesium, chlorides, nitrates and nitrites. The Kirkwood - Cohansey also exhibited problems with salt water intrusion along coastal areas of the County. This problem occured when potable water was pumped from the Kirkwood - Cohansey and was replaced by seawater. When wells are contaminated by salt water, the only current solution is to abandon the well and either drill a new one in a deeper aquifer or connect to a public supply system which can adequately accomodate the increased demand.

Despite localized problems associated with the Kirkwood - Cohansey, the US Geological Survey considered water from this aquifer to be generally suitable for drinking. Water level changes varied widely, reflecting the balance between precipitation and evapotranspiration plus groundwater discharge. The Kirkwood - Cohansey system can be locally recharged practically anywhere in the County. Regional recharge to the deeper areas of this aquifer occurs primarily in western Ocean County and in recharge areas well outside the County's boundaries. Water taken from shallower wells in this formation is often replaced locally from adjacent streams, ponds, or wetlands. Deeper wells are primarily recharged by regional recharge areas. This occurence probably accounts for inconsistencies noted in the water level changes of adjacent wells. The map on the following page shows the aquifer recharge areas within Ocean County for the non-water table aquifers.

The other aquifers underlying Ocean County are confined and artesian. Artesian aquifers are those which slope seaward from higher ground, beneath a confining bed. Water in the deeper areas of these aquifers is under pressure and will rise to the surface when tapped by a well. The major chemical characteristic of water in deeper confined aquifers is calcium bicarbonate, giving the water a relatively high pH. Down gradient in each of the same aquifers, sodium replaces calcium as the dominant cation. This usually reflects

Figure 2-12

Aquifer Recharge Areas

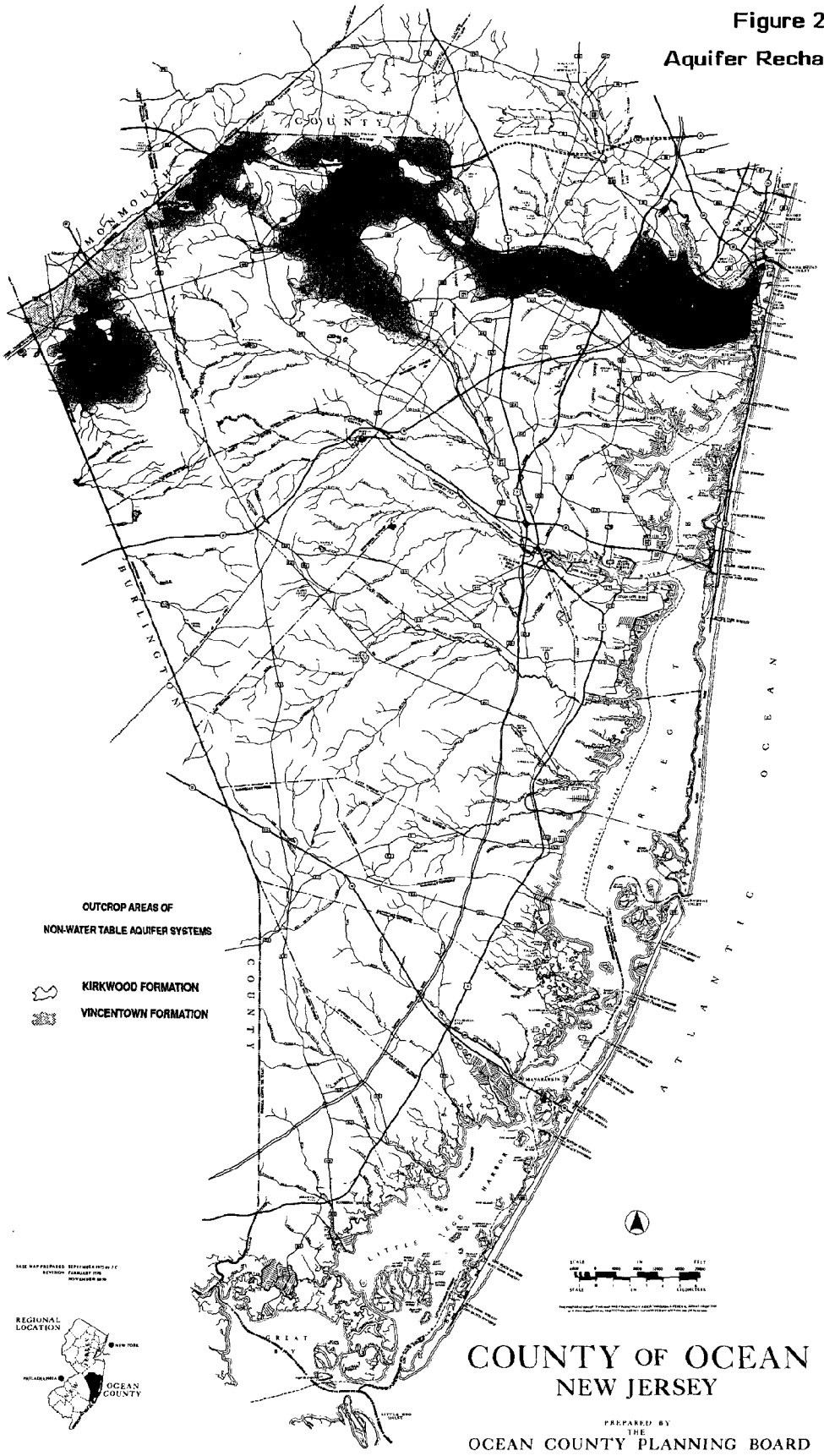
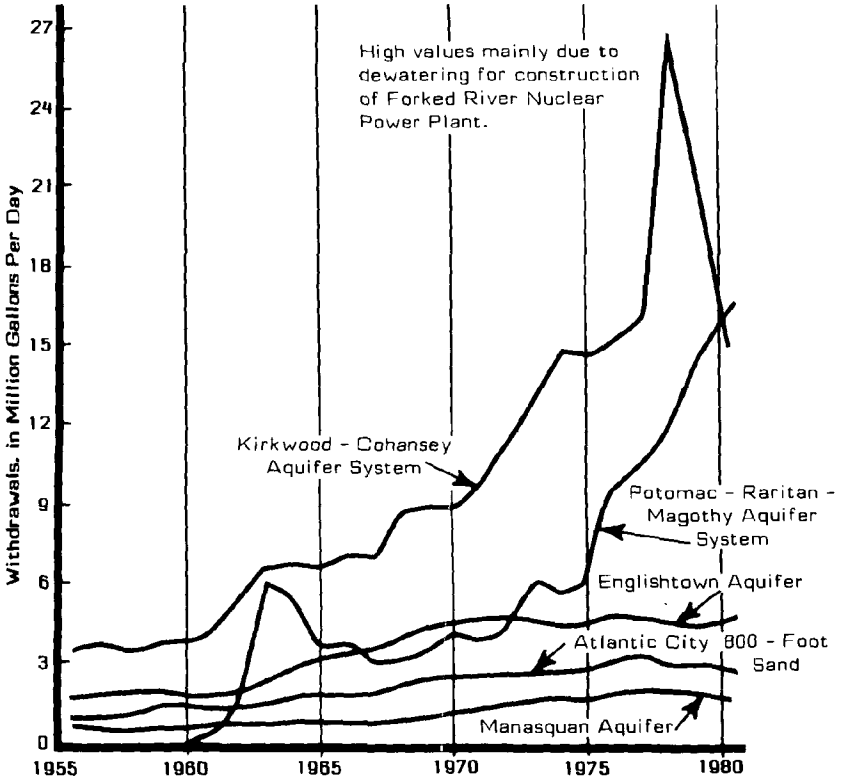


Figure 2-13
Major Withdrawals From the Coastal Plain Aquifers, 1956-1980



Source: US Geological Survey, Ground - Water Quality in East - Central New Jersey, and a Plan For Sampling Networks, 1985.

natural cation exchange processes but may also be an indication of salt water intrusion. Sodium carbonate is usually the major chemical characteristic of the aquifers closer to the surface. From the 1950's to the 1970's, increased withdrawals caused large regional cones of depression within the major artesian aquifers. However, withdrawals from most of the major aquifers stabilized during the late 1970's and early 1980's. As of 1983, total withdrawals from these major aquifers were 28.7 MGD.

The deepest of the aquifers underlying Ocean County is the **Potomac - Raritan - Magothy.** This aquifer system has been the second most used in the County, supplying 15.8 MGD in 1980. It has also been used by the majority of large water suppliers in Ocean County. The water in this aquifer is of good to excellent quality with only a few localized wells containing high iron and manganese concentrations. This aquifer system is also susceptible to salt water intrusion along southern coastal areas, however most of the major supply wells are located in the northern half of the County. Water levels in the Potomac - Raritan - Magothy have declined ten to sixteen feet in northeast Ocean County from 1978 to 1983. In other areas of the County, water level changes have been inconsistent:

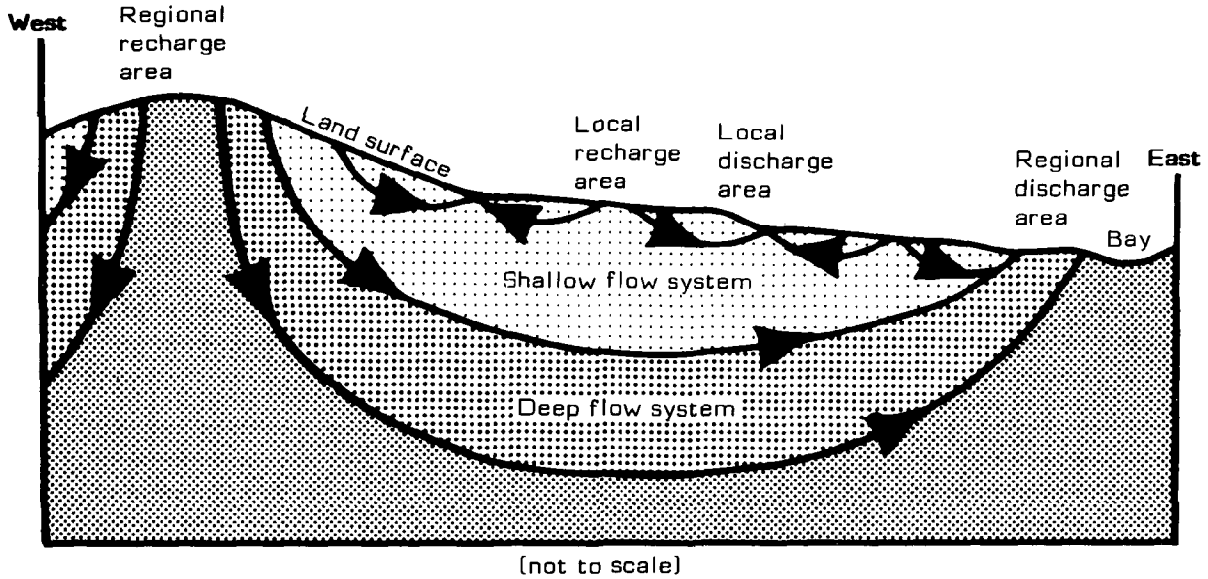
Table 2-10
Groundwater Resources of Ocean County

Aquifer	Depth To Top of Aquifer*	Average Thickness	Withdrawals In 1980 (Mgal/d)	General Chemical Characteristic	Locally Excessive Chemicals	Area Of The County Supplied
Potomac-Raritan-Magothy (Upper)	-400 to -2000	145 feet	15.80	Calcium bicarbonate	Iron and Manganese	Northern
Englishtown	-110 to -1150	139 feet	5.30	Calcium bicarbonate	Iron, Manganese and Sodium	Northern
Wenonah-Mt Laurel	+5 to -1700	72 feet	0.37	Calcium bicarbonate	Iron	Northern
Vincentown	+100 to -150	58 feet	0.58	Calcium bicarbonate	Manganese	North-Western
Piney Point	-125 to -825	85 feet	2.10	Sodium bicarbonate	Iron and Sodium	South-Central
Atlantic City 800 Foot Sand	-375 to -575	85 feet	4.10	Calcium and Sodium bicarbonate	Iron and Manganese	Southern
Kirkwood-Cohansey	----------	230 feet	16.10	Chemically variable however Sodium and Potassium tend to predominate	Dissolved Solids, Chlorides, Nitrates, Iron and Manganese	Mainly Central, however wells are distributed throughout the County

*Datum is sea level. Low depths are located in the North-Western area of Ocean County while the highests depths are found in the South-East. Mgal/d = Millions of gallons per day.

Source: US Geological Survey, Hydrogeologic Framework of the New Jersey Coastal Plain, 1984.
Ground-water Quality in East-Central New Jersey, and a Plan for Sampling Networks", 1985.

Figure 2-14
Generalized Groundwater Flow in Kirkwood-Cohansey System



Source: US Geological Survey, Ground - Water Quality in East - Central New Jersey, and a Plan For Sampling Networks, 1985.

some wells have displayed a small decrease while others have actually increased. The increase can usually be attributed to a reduction or cessation of major well withdrawals in that particular area.

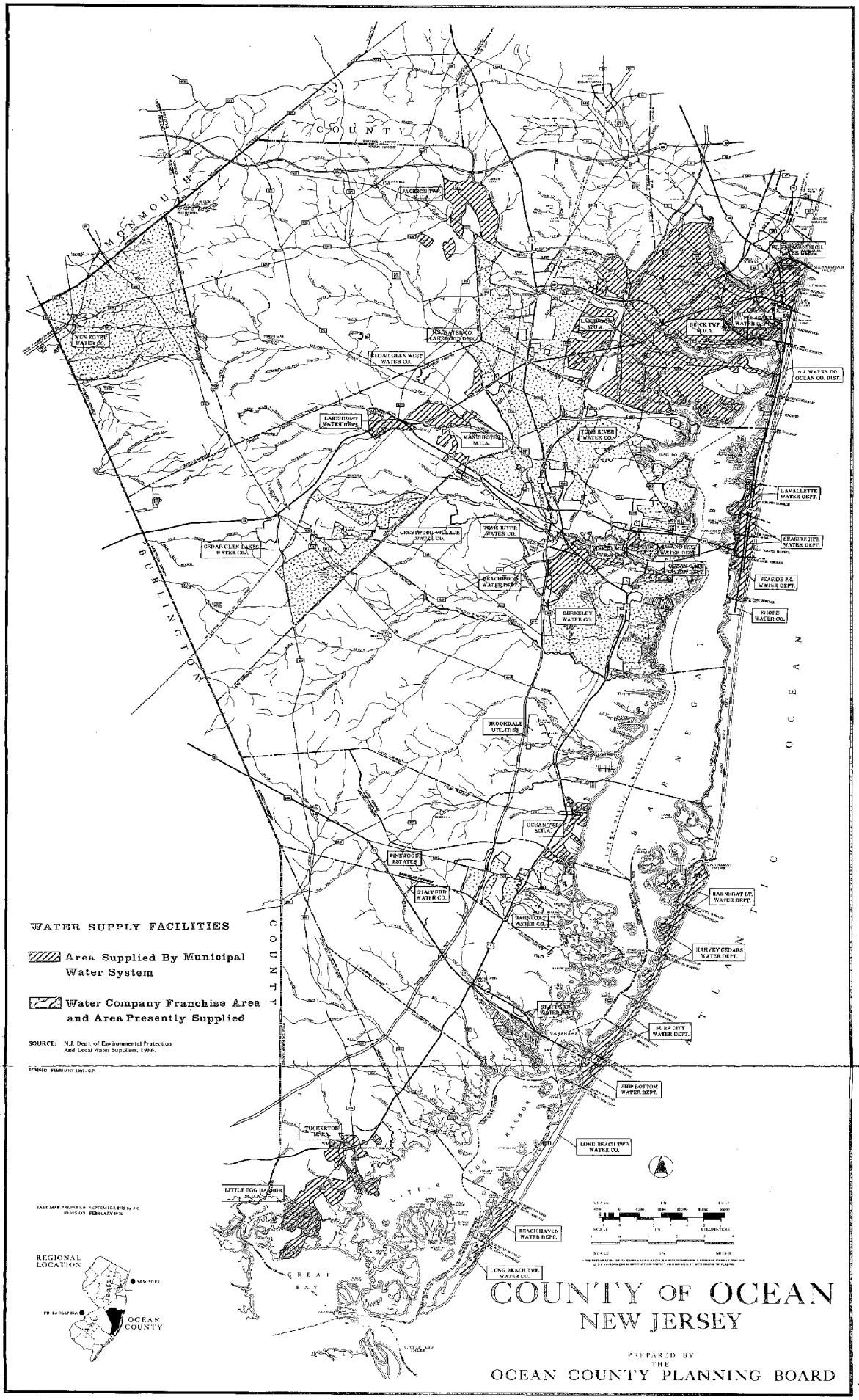
The **Englishtown Aquifer**, located just above the Potomac - Raritan - Magothy, is also an important source of water in northern Ocean County. Water quality in this aquifer is generally good except for locally high concentrations of iron and manganese. A few deeper wells located along the coast also recorded sodium levels higher than water quality standards. In 1980, 5.3 MGD of water was supplied to northern Ocean County from this aquifer. Although this amount is approximately one-third of that supplied by the Potomac - Raritan - Magothy, water levels in the Englishtown formation have dropped eight to twenty feet from 1978 to 1983 in areas of Brick Township and Point Pleasant Borough. A potential reason for this significant drop is the low transmissivity of the Englishtown Aquifer, causing water levels to take longer to return to their previous height following major withdrawals.

The overlying **Wenonah - Mt. Laurel Aquifer** also has water level declines which coincide with those of the Englishtown Aquifer. This similarity is the result of a hydraulic connection between the two aquifers, and there is significant downward vertical leakage occurring through the confining layer which separates these two aquifers. The Wenonah - Mt. Laurel is only a minor water source in Ocean County, supplying only .37 MGD in 1980. The quality of water in this aquifer is generally satisfactory with excessive iron concentrations in some wells.

The **Vincentown Aquifer** is also a minor aquifer and serves as a water supply for some areas in northwest Ocean County. The quality of the water in this aquifer is generally good, with few excessive manganese concentrations. The chemical concentration of limited areas of the Vincentown remains very stable, changing very little over the past eighteen years. Like the aquifers beneath it, the major chemical characteristic of the Vincentown Aquifer is calcium bicarbonate, which gives the water a high pH. Besides the Kirkwood - Cohansey, the Vincentown is the only aquifer system that outcrops, and as a result is recharged in Ocean County.

The **Piney Point Aquifer**, also known as the Manasquan, supplied 2.1 MGD of water to south-central Ocean County in 1980. The quality of this water is generally satisfactory with locally high concentrations of iron and sodium. The major chemical characteristic of this aquifer is sodium bicarbonate. Water levels have dropped from one to fourteen feet from 1978 to 1983. Two significant cones of depression, reflecting declining water levels, have been found near Seaside Park and Barnegat Light.

The southern most portion of Ocean County draws water from the **Atlantic City 800 Foot Sand**, an aquifer which is actually a confined area of the Kirkwood Formation.


MONMOUTH COUNTY
BURLINGTON COUNTY
ATLANTIC COUNTY
OCEAN
BARNEGAT BAY
LITTLE EGG HARBOR
GREAT BAY
JACKSON TWP. M.U.A.
NEW EGYPT WATER CO.
CEDAR GLEN WEST WATER CO.
LAKEHURST WATER DEPT.
MANCHESTER M.U.A.
LAKEWOOD M.U.A.
BRICK TWP. M.U.A.
N.J. WATER CO. OCEAN CO. DIST.
TOMS RIVER WATER CO.
LAVALLETTE WATER DEPT.
SEASIDE HTS. WATER DEPT.
SEASIDE PK. WATER DEPT.
SHORE WATER CO.
CRESTWOOD VILLAGE WATER CO.
CEDAR GLEN LAKES WATER CO.
BEACHWOOD WATER DEPT.
BERKELEY WATER CO.
BROOKDALE UTILITIES
OCEAN TWP. M.U.A.
PINEWOOD ESTATES
STAFFORD WATER CO.
BARNEGAT WATER CO.
BARNEGAT LT. WATER DEPT.
HARVEY CEDARS WATER DEPT.
SURF CITY WATER DEPT.
SHIP BOTTOM WATER DEPT.
LONG BEACH TWP. WATER CO.
TUCKERTON M.U.A.
LITTLE EGG HARBOR M.U.A.
BEACH HAVEN WATER DEPT.
LONG BEACH TWP. WATER CO.
WATER SUPPLY FACILITIES
Area Supplied By Municipal Water System
Water Company Franchise Area and Area Presently Supplied
SOURCE: N.J. Dept. of Environmental Protection And Local Water Suppliers, 1986.
REVISED: FEBRUARY 1991 - G.P.
BASE MAP PREPARED SEPTEMBER 1975 by P.C. REVISION FEBRUARY 1976
REGIONAL LOCATION
NEW YORK
PHILADELPHIA
OCEAN COUNTY
SCALE IN FEET
SCALE IN KILOMETERS
SCALE IN MILES
COUNTY OF OCEAN
NEW JERSEY
PREPARED BY THE
OCEAN COUNTY PLANNING BOARD

In 1980, 4.1 MGD of potable water was supplied from this system. The quality of this water is generally satisfactory with locally high concentrations of iron and manganese. Over the five year period from 1978 to 1983, water levels in this artesian aquifer have declined one to sixteen feet in coastal Ocean County. The largest decline was noted in Harvey Cedars. Above the Atlantic City 800 Foot Sand is a massive clay bed that partially separates it from the overlying Kirkwood - Cohansey Aquifer. In Ocean County, the boundary of this clay barrier runs in a northeast to southwesterly direction from the southern tip of Island Beach State Park to the northern area of Bass River State Forest in Little Egg Harbor Township. It is not known whether the Atlantic City 800 Foot Sand continues beyond the western edge of the confining barrier to form a part of the water table system to the west. If it does, most of the recharge to this aquifer would be from unconfined areas.

The **Rio Grande Aquifer** is a small water bearing zone which lies within this large confining bed. In 1980, the Rio Grande supplied .47 MGD to municipalities on the southern tip of Ocean County. Results of limited testing by the US Geological Survey have shown that the water in this aquifer is chemically characterized by sodium bicarbonate. As with many aquifers underlying Ocean County, the Rio Grande also contains locally high concentrations of iron.

The preceding section summarizes the hydrologic characteristics of the major aquifers utilized for water supplies in Ocean County. Concern over expanded diversions from these systems and degradation of groundwater quality has resulted in increase investigations by County, state and federal agencies on the best way to manage this resource. These investigations have led to the implementation of ambient monitoring for both quality and quantity of specific aquifer systems, chloride monitoring and increased management of permitted withdrawals. The intent of these programs is to insure the long-term viability of the aquifer systems as a source of water supply.

Increased development in Ocean County has also resulted in some portions of the County being developed at densities which are inappropriate for on-site domestic wells. In addition, localized contamination from a variety of sources, particularly in the water table aquifer and the upper portion of the Kirkwood - Cohansey system has resulted in the closure of some wells. These trends have led to an increasing number of Ocean County residents relying on public and private water purveyors for water supply, rather than individual domestic wells.

In 1986, 24 municipal or municipal utility authority water systems provided water to Ocean County residents. In addition, ten private purveyors provided drinking water, typically to individual residential developments. The source of supply for these systems

is typically the deeper, confined aquifer systems although some wells tap the Cohansey Sands. The Brick Township MUA in 1986 received the first surface water diversion permit in Ocean County for potable water supply. This permit allows Brick to utilize 6.0 MGD of excess flow from the Metedconk River as a source of drinking water. The Water Supply Facilities Map illustrates the areas of Ocean County served by public and private purveyors.

LAND USE

In 1977, a detailed field survey of existing land use was completed as part of the Areawide Water Quality Management Plan. This survey was conducted by municipality, and the detailed municipal land use maps were used to determine the amount of land actually developed. It is important to note that the existing land use map and acreage tabulations present the extent of actual land coverage or active use. In the following section, the characteristics of the separate land use categories are briefly discussed and significant uses are identified.

Lakewood's Presbyterian Church illustrates the mixture of old and new characteristic of the County.

Ocean County had approximately 29,700 acres of land developed for residential purposes. **Residential land** usage accounted for 22 percent of the developed land in the County and seven percent of the total land area. Single-family units were the most prevalent residential type, occupying 24,300 acres. Multi-family units, including duplexes, utilized an additional 1,600 acres of residential land. Mobile homes were located on another 400 acres. Other significant residential types included seasonal homes, lagoon housing developments and adult communities.

Adult communities are an especially important residential type in Ocean County. These residential communities are developed specifically to house retired, semi-retired or soon-to-be retired persons. Communities generally have minimum age requirements and prohibit the permanent residence of school-age children. The adult communities constructed in the County can best be described as planned, low density, age-restricted developments constructed by private capital and offering relatively low-cost housing in

Table 2-11
Adult Communities and Dwelling Units by Municipality

Municipality	Adult Communities	Dwelling Units	Estimated Population
Barnegat	2	362	692
Berkeley	8	11,675	20,049
Brick	7	2,973	5,337
Dover	4	2,317	4,524
Eagleswood	1	48	86
Jackson	8	978	1,833
Lacey	1	141	254
Lakewood	4	4,502	6,641
Little Egg Harbor	1	124	200
Manchester	7	13,732	25,267
Stafford	1	240	450
Ocean County	**44**	**37,092**	**65,333**

Source: Ocean County Planning Board, 1986.

a variety of unit types with a range of recreational and community services tailored specifically to the needs and interests of the elderly. Congregate, life-care communities which combine housing and health care services have recently emerged as a new housing concept for the elderly.

The construction of adult communities in Ocean County has been rapid. The first adult community in the County was constructed in 1964. By 1986, there were 44 adult communities in the County with over 37,000 dwelling units. Furthermore, the supply of this housing type is expected to continue to expand. The Center for Urban Policy Research at Rutgers University conducted a survey of adult communities in New Jersey which found that demand for New Jersey retirement development is primarily indigenous to the State. The geographic market of demand is predominantly from the northern New Jersey counties of Essex, Hudson and Bergen. The study also demonstrated that demand was being increasingly supplemented by migration from the New York City and Philadelphia metropolitan areas. This finding is consistent with a nationwide trend for older persons to make short-distanced moves, relocating from the central cities to metropolitan fringe areas such as Ocean County.

The adult communities in Ocean County provide a variety of housing types. Housing ranges from single family detached units to duplexes, quadraplexes and octaplexes.

Manufactured and mobile homes are also provided. A variety of ownership options are available. These options include fee simple, condominium, cooperative and mobile home. In mobile home retirement developments, the mobile home is typically owned in fee simple, and the lot is rented from the owner-developer.

Business and commercial uses have also expanded with the rapid increase in Ocean County's population. The commercial base of the County has developed a year-round rather than seasonal orientation. The 1977 land use survey reported that approximately 3,647 acres or two percent of the developed land in Ocean County was used for business and commercial purposes.

Traditional communities in Ocean County, such as Toms River, Manahawkin and Forked River continue to serve as business and commercial centers. Downtown Lakewood has the single largest concentration of retail, wholesale, service and professional establishments in the Ocean County area. Large commercial centers have also become established at the intersections or interchanges of major highways. Examples of these centers include the Brick Boulevard/Route 70 area and the Laurelton Circle in Brick Township. In Dover Township, the Route 37 and Garden State Parkway interchange area is a commercial center. The Ocean County Mall which opened in 1976 at the intersection of Hooper Avenue and Bay Avenue in Dover Township serves as a major regional shopping center for the Ocean County area.

Downtown Lakewood is a traditional commercial center which is undergoing redevelopment.

Commercial strip development has also occurred adjacent to many highways. There has been, for example, extensive commercial development along US Route 9, a major north-south highway route. Along Route 37 in Dover Township, commercial development extends from the Garden State Parkway eastbound to the Mathis and Tunney bridges crossing Barnegat Bay. More recently, commercial activity is extending westward along Route 37 toward Manchester Township. Other major highways along which strip commercial development has occurred include Hooper Avenue/Brick Boulevard, Fischer Boulevard, Route 88, segments of Route 70, Route 72 and Lacey Road.

Although the commercial structure of Ocean County is expanding in response to a growing year-round resident population, seasonally-operated commercial establishments remain significant in the County. These establishments are concentrated in various coastal communities and depend in large part on the thousands of vacationers and tourists that visit the County each summer for their economic well-being.

Commercial recreation uses occupied 775 acres of land in Ocean County. In the past, commercial recreation facilities have been heavily oriented toward the resort area of the Shore. They have been, and continue to be, economically dependent on the influx of summer visitors. Examples of commercial recreation uses include boardwalk and amusement parks, miniature golf courses and other games, bowling alleys, movie theaters and similar uses. There are major concentrations of commercial recreation uses at oceanfront boardwalks in Point Pleasant Beach and Seaside Heights.

Point Pleasant Beach is the home port of the State's second largest commercial fishing fleet.

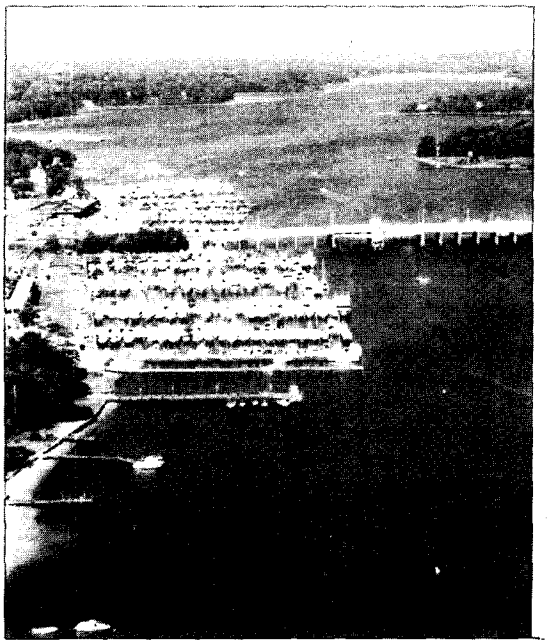
Recreational uses in the inland portion of the County are being increasingly developed, especially family campgrounds which take advantage of the County's lakes and streams. The largest commercial recreation use in the County is Great Adventure Amusement Park located in the northwestern corner of Jackson Township. Great Adventure includes a theme amusement area and a safari park. It is owned and operated by Six Flags, a private company.

The land use survey identified 328 acres devoted to **marine commercial** usage. Marine commercial establishments in Ocean County principally include: dockage for commercial and sport fishing fleets, marina facilities for pleasure craft and marine construction firms specializing in such activities as dredging and bulkheading.

Commercial fishing plays an important, although declining, role in the County economy. The fleet includes over 2,000 commercial and livery boats. This figure represented 48 percent of all commercial and livery craft registered in New Jersey during 1977. There were also 80 charter boats and 31 party boats based in the County. The fishing fleet, including the commercial charter fleet, requires easy access to the Atlantic Ocean. For this reason, dockages are centered along the Manasquan River and in proximity to the Manasquan Inlet, near the Barnegat Inlet and close to the entrance to Little Egg Harbor Bay.

Marina facilities that provide services for the pleasure boating fleet expanded significantly in Ocean County through the 1970's. In 1977, there were 46,966 pleasure boats registered in Ocean County. This represented 41 percent of New Jersey's total pleasure boat fleet. In 1976, there were 210 marina facilities operating in the Ocean County area. These facilities vary considerably in size, use and type of service offered at the marina. Some of the largest marinas on the east coast are located in Ocean County. There are both public and private marina facilities in Ocean County. The most numerous are private establishments which offer a range of services including any and all of the following: boat sales and rentals, gasoline sales, slip rentals, repair and storage facilities, restaurants, bars and retail services. The type of service offered usually is a function of the marina's size and number of slips.

The State of New Jersey maintains a marina at Forked River, Lacey Township, which provides 100 berths. This marina provides slip rentals, parking and lavatory facilities. The State also maintains a sixteen berth facility at Point Pleasant for use as a marine police station. There are also numerous municipally owned and operated marinas offering services generally equivalent to the state marina. The public marinas normally do not provide winter storage or repair services.



Public and private marinas provide services to the County's pleasure boat fleet, largest in the state.

There were approximately 11,115 acres of developed **industrial land** in the County. The vast majority of industrial firms in the County are classified as light industrial. Small scale assembly, processing, service, or research and development industries occupied 978 acres. There are three large industrial plants classified as heavy industry located in the County. Together, these three firms utilized 1,323 acres of developed land. The largest industrial concern in the County is Ciba-Geigy, located in Dover Township. This firm produces chemicals and allied products. Fluid Chemical Company in Lakewood and Warren Industries in Ocean Township are the other industrial concerns represented in the heavy industry category in the County.

Sand and mineral mining activities involved over 4,622 acres in Ocean County. A variety of materials are mined including sands and gravel for construction, silica sand for

glass making and ilmenite which is used in making paint. Existing extractive uses are located throughout the inland portion of the County. Active sand and gravel mining operations are now primarily concentrated in the Pinelands section of the County, particularly in Jackson, Manchester and Lacey Townships.

Approximately 2,226 acres in Ocean County were classified in the **utility and transportation** category. While this includes electric transmission lines and rail rights-of-way, the largest single use is the Oyster Creek Nuclear Generating Station located west of Route 9 in Lacey Township. The Oyster Creek plant provides power to the Jersey Central Power and Light Company. The nuclear plant was completed in 1967 and has a rated capacity of 515,000 kilowatts of electricity. The station is water cooled and discharges non-contact cooling water at a rate of 460,000 gallons a minute into Oyster Creek. Construction was begun on a second plant immediately adjacent to the Oyster Creek with a rated capacity of 1,200,000 kilowatts. However, construction of this facility was discontinued because of cost and demand projections. The General Power Utilities Company has subsequently abandoned plans for a second nuclear facility at this site.

The historic County Courthouse is the oldest building at the County's office complex in Toms River, the County seat.

Public and quasi-public uses occupied a large portion of Ocean County, more than 90,488 acres. This acreage represented approximately 67 percent of the developed land and 22 percent of the total land acreage of Ocean County. Of this total, 87,060 acres were used for public uses. Parks and conservation areas are the largest public land uses in Ocean County. These include municipal, County and State parks and State fish and game areas, State forests and Federal wildlife management refuges. Parks and conservation areas occupied 60,817 acres of land.

Military installations are also a major land use in Ocean County. The two major installations, Lakehurst Naval Air Engineering Center and Fort Dix, cover 23,398 acres in Manchester, Jackson and Plumsted Townships. Other military uses occupy 617 acres. These installations include Coast Guard Stations at Point Pleasant and Barnegat Light, New Jersey National Guard Armories in Dover and Tuckerton and the Lakehurst Satellite Communications Station in Little Egg Harbor.

Public land uses also include governmental offices and buildings which comprised 658 acres of land. Township and borough offices and other municipal facilities are included in this category. The County office complex in Toms River, Dover Township, the Ocean County Board of Health Building, Agricultural Building, Northern and Southern Resource Centers and the Robert J. Miller Airpark are also included. Schools and educational facilities occupied an additional 1,570 acres. This includes public elementary, intermediate and high schools, vocational schools and the Ocean County College.

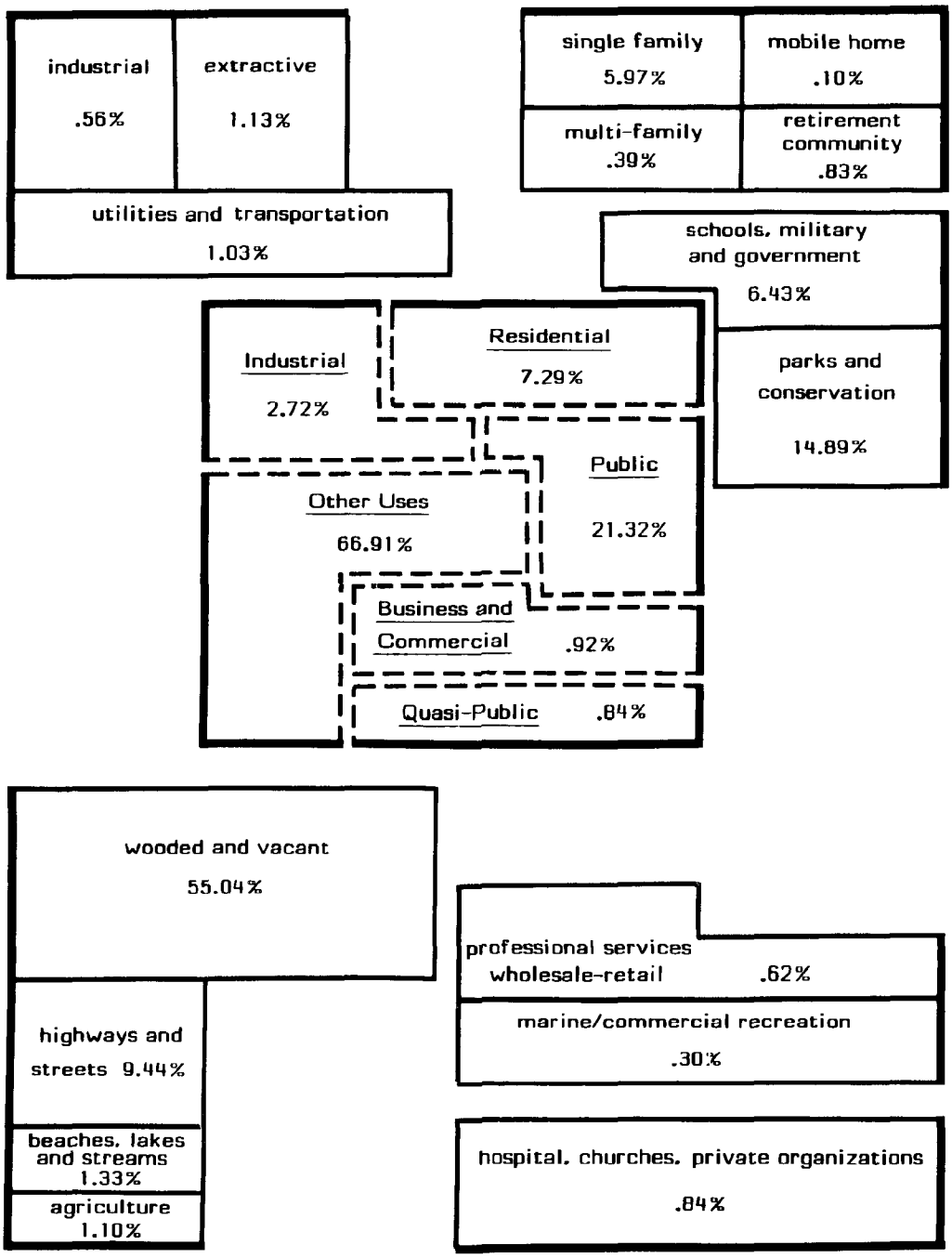
Quasi-public land uses include churches, private clubs and organizations, cemetaries and other similar uses. The six area hospitals, Paul Kimball in Lakewood, Community Memorial and Garden State Rehabilitation Hospital in Dover, the Point Pleasant Hospital, the Brick Hospital and the Southern Ocean County Hospital in Stafford are also classified as quasi-public. In 1977, these land uses utilized 3,428 acres of land.

As expected in a County which is emerging as a suburban area, **vacant and wooded** lands represented the largest acreage. With 224,781 acres, vacant and wooded lands represented 55 percent of the total land area in the County. While most municipalities, with the exception of those on the barrier beaches, have substantial amounts of vacant land, the greatest concentration occurs inland, west of the Garden State Parkway. This includes the Pinelands region which remains virtually undeveloped in many areas of the County. Water bodies, including lakes and streams, are also contained in this category.

The characteristic Victorian homes of Island Heights will be preserved in its Historic District.

Highways and streets comprised 38,556 acres or 9 percent of the land area in the County. This figure includes all land occupied by the existing highway network. Dedicated rights-of-way or paper streets were considered as vacant land in the land use survey. The remaining uses in this category included public beaches, 280 acres; private beaches, 131 acres; lakes and streams, 5,030 acres; and agriculture, 4,472 acres. The land use survey indicated that 3,377 acres of land were actively in use at the time of the survey for raising cash crops in Ocean County. There were also 1,094 acres devoted to livestock production and equestrian centers. Actively farmed lands in Ocean County are concentrated in the

Figure 2-16
Existing Land Use in Ocean County



Note: Percent figures represent percentage of total land use.

Source: Ocean County Planning Board, Ocean County Areawide Water Quality Management Plan, 1978.

northwestern part of Ocean County, primarily in Plumsted, Jackson and portions of Lakewood Townships.

This detailed municipal survey of existing land use was used to prepare a generalized land use map for Ocean County. In 1986 the generalized County map was revised to illustrate additional land area developed since the completion of the survey. The generalized County map identifies existing patterns of land use according to fifteen use classifications. A copy of this map is included with this report. Detailed land use calculations associated with this map were not prepared. The acreage totals discussed in the preceding section continue, however, to provide a good overview of the use of land in the County.

HISTORIC SITES

The long and varied history of Ocean County is preserved at numerous historic sites. These sites range from those of primarily local significance to sites which are included on both the National and State Registers of Historic Places. Those sites which are included on the National and State Registers have met selection criteria that include:

1. Association with events that have made a significant historic contribution to history; or
2. Association with the lives of significant historic persons; or
3. Embody the distinctive characteristics as a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values; or
4. Have yielded, or may be likely to yield, information important in prehistory or history.

Historic resources that may be included on the National and State Registers include buildings, structures, sites, objects or districts. In Ocean County twelve sites have been included on both the National and State Registers. A total of thirteen sites are on the State Register, and one is pending National review. These sites are listed in Table 2-12 on the following page.

In 1981, the Ocean County Cultural and Heritage Commission prepared the New Jersey Historic Sites Inventory for Ocean County. The purpose of this survey was to locate, describe, record and photograph Ocean County's existing historic resources as an inventory of places with ties to Ocean County's heritage. This extensive inventory served as a basic study for the Master Plan. Municipalities and individuals should consider use of the inventory as a tool for planning and review of public or private development projects.

Moreover, certain historic sites such as those on the National Register are affected by State and federal laws and regulations concerning historic resources. All federally-funded, assisted or licensed projects require review by the sponsoring agency to determine their effect on historic sites. This review applies not only to properties already on the National Register, but also to those found eligible for such listing. Municipal, County or state projects involving sites on the State Register are also subject to such review: projects exceeding one million dollars must also account for eligible properties as well. If the proposed project encroaches upon historic resources, mitigation of any adverse impacts is required.

Table 2-12
National and State Historic Sites, Ocean County

Historic Resource	Municipality	National Register	State Register
Barnegat City Public School	Barnegat Light	June 1976	December 1975
Barnegat Lighthouse	Barnegat Light	January 1971	September 1970
Beach Haven Multiple Resource Area	Beach Haven	July 1983	April 1983
Cassville Historic District	Jackson	August 1982	June 1982
Double Trouble State Park Historic District	Berkeley	February 1978	October 1977
First Baptist Church of Laurelton	Brick	August 1977	January 1977
George J. Gould Estate	Lakewood	December 1978	August 1978
Strand Theatre	Lakewood	April 1982	March 1981
Hanger No. 1, Lakehurst	Manchester	May 1968	August 1979
U.S. Lifesaving Station No. 14, Island Beach State Park	Berkeley	January 1978	March 1977
Manahawkin Baptist Church	Stafford	April 1973	May 1972
Island Heights Historic District (375 Buildings)	Island Heights	July 1982	February 1981
Old Toms River Multiple Resource District (11 Buildings)	Dover	Pending	June 1981

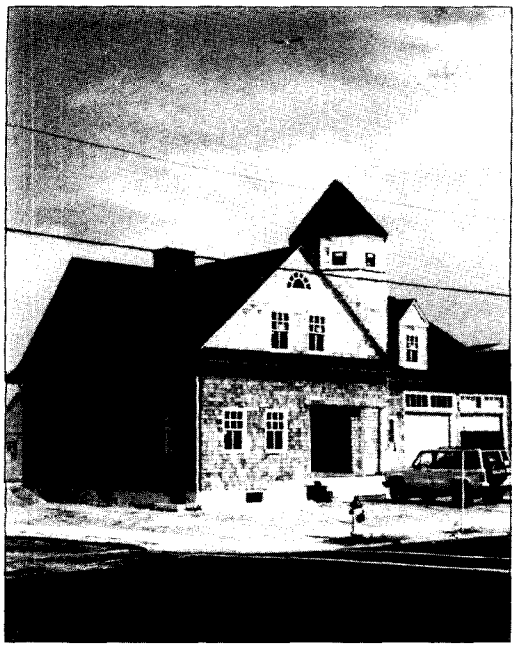
Source: Ocean County Cultural and Heritage Commission, 1986.

In addition, the New Jersey Pinelands Commission has designated certain historic, archealogical or cultural resources and districts which represent or reflect significant elements of the Pinelands cultural, social, economic, political and architectural history

and prehistory. Municipalities are required to provide a program for the protection of such resources in their master plan or land use ordinance. Designated sites in Ocean County are:

1. **Double Trouble State Park Historic District.** Berkeley and Lacey Townships.
2. **Hanger Number One.** Lakehurst Naval Air Engineering Center, Manchester Township.
3. **Mullica River.** Chestnut Neck Historic District, Little Egg Harbor Township.

The County's historic resources which are embodied in its historic buildings and districts represent a valuable social and economic investment that contribute to the image and fabric of the communities that comprise Ocean County. The County and its municipalities must make an effort to enhance its historic resources through preservation, restoration or rehabilitation. Such efforts can have beneficial results including increased tourism, increased demand for commercial and residential properties in the historic area and adjacent areas and an increased civic pride in the maintenance of their buildings and the community.



The Coast Guard Station in Seaside Park is being restored with federal funds administered by the County.

AIR QUALITY

According to State and National ambient air quality standards, Ocean County is classified as a Class II, attainment area for all six criteria pollutants except ozone. However, the entire State of New Jersey is classified as a nonattainment area for the ozone parameter. The six criteria pollutants include suspended particulate matter, sulfur dioxide, hydrocarbons, carbon monoxide, ozone and lead. The NJ Department of Environmental Protection operates one monitoring station located in downtown Toms River which continuously registers carbon monoxide, sulfur dioxide and smoke shade levels.

Air quality data for the County is limited. The lack of data makes it very difficult to accurately assess present air quality conditions for the overall County. The surveillance

station in Toms River, located at the intersection of Main Street and Washington Street, has been operated since 1971. Carbon monoxide levels at this station have exceeded ambient air quality standards. However, the average number of times the eight hour standard was exceeded has declined from 68 violations in 1975 and 73 times in 1976 to seven times in 1979 and two times in 1980.

The Ocean County Planning Board conducted an Air Quality Control study for the County as the local component of the federally required State Implementation Plan. As part of that planning program, the County identified certain intersections, road segments or highway facilities that are considered "hot spots", exceeding air quality standards for an eight hour average. The study also recommended the implementation of Reasonably Acceptable Control Measures (RACM's) intended to improve existing air quality conditions.

The following table ranks these identified "hot spots" in order of importance and level of observed impacts on traffic, pedestrian and other human activities or adjacent public areas. While recent highway system improvements have resulted in increased road capacity, additional measures are needed to remove bottlenecks and decrease queing.

In addition to these highway associated sources, there are also fifteen industrial point sources in Ocean County which hold State emission permits. Many of these facilities manufacture asphalt and wood products and particulates are the principal emissions. Three industrial point sources contribute sulfur dioxide as well as particulates.

Table 2-13
Ocean County Areas Exceeding National Ambient Air Quality Standards for Carbon Monoxide

County Ranking	Hot Spot Locations
1.	Washington Street - Main Street, Toms River CBD.
2.	Water Street - Main Street, Toms River CBD.
3.	Old Freehold Road - Route 166, Dover Township.
4.	Laurelton Circle, Brick Township.
5.	US Route 9 - Central Avenue, Lakewood Township.
6.	Church Road - Hooper Avenue, Route 549, Dover Township.
7.	Hooper Avenue (Route 549) - NJ Route 37, Dover Township.
8.	US Route 9 - Kennedy Boulevard, Lakewood.
9.	US Route 9 - County Line Road (Route 526), Lakewood Township.
10.	Lanes Mill Road (Route 549) - Burnt Tavern Road (Route 632), Brick Township.
11.	Route 166 - NJ Route 37, Dover Township.

Source: Ocean County Planning Board, 1982.

While it is not possible to give a detailed assessment concerning the present state of air quality in Ocean County, it can be stated that with the exception of carbon monoxide, air quality parameters at the monitoring stations are generally well below Federal and State standards. Carbon monoxide levels have improved as a result of vehicle emission control programs and transportation system improvements which enhance uninterrupted traffic flow. Data regarding suspended particulates indicates that no violations of either primary or secondary standards have been detected. Annual deterioration increments which are applicable to Class II areas have not been violated since the inception of the State regulations in 1974.

TRANSPORTATION

Improvements to the transportation network have greatly influenced the present shape and form of the County. The network includes all available modes of travel including auto, bus, rail, air and waterborne. This integrated network is the circulatory system of Ocean County, bringing people and goods into the County and providing the means by which they move freely from one activity to another. As demands on the system change, both short and long-range solutions are needed to maintain and strengthen the transportation network.

Highway System

The highway system has emerged as the most important component of the County's transportation infrastructure. Ocean County has the highest number of County road miles within the north Jersey region, reflecting a substantial capital investment. The highway system is comprised of a hierarchy of roadways classified as local, collector and arterial. Each of these roadways performs a distinct function according to its original design capacity and relationship to the overall highway network.

All roadways within Ocean County have been classified according to the functional classification system developed by the Federal Highway Administration. The Federal Highway Act sets forth the definition for each roadway designation according to functional use. The classification procedure considers the highway or street as part of the overall travel network. The majority of vehicle trips impact a number of roadways having different design capacities. Traffic congestion or unsafe conditions usually indicate that the affected roadway is being utilized for a function not originally intended. The 1990 Functional Classification of Highways map appears on the following page.

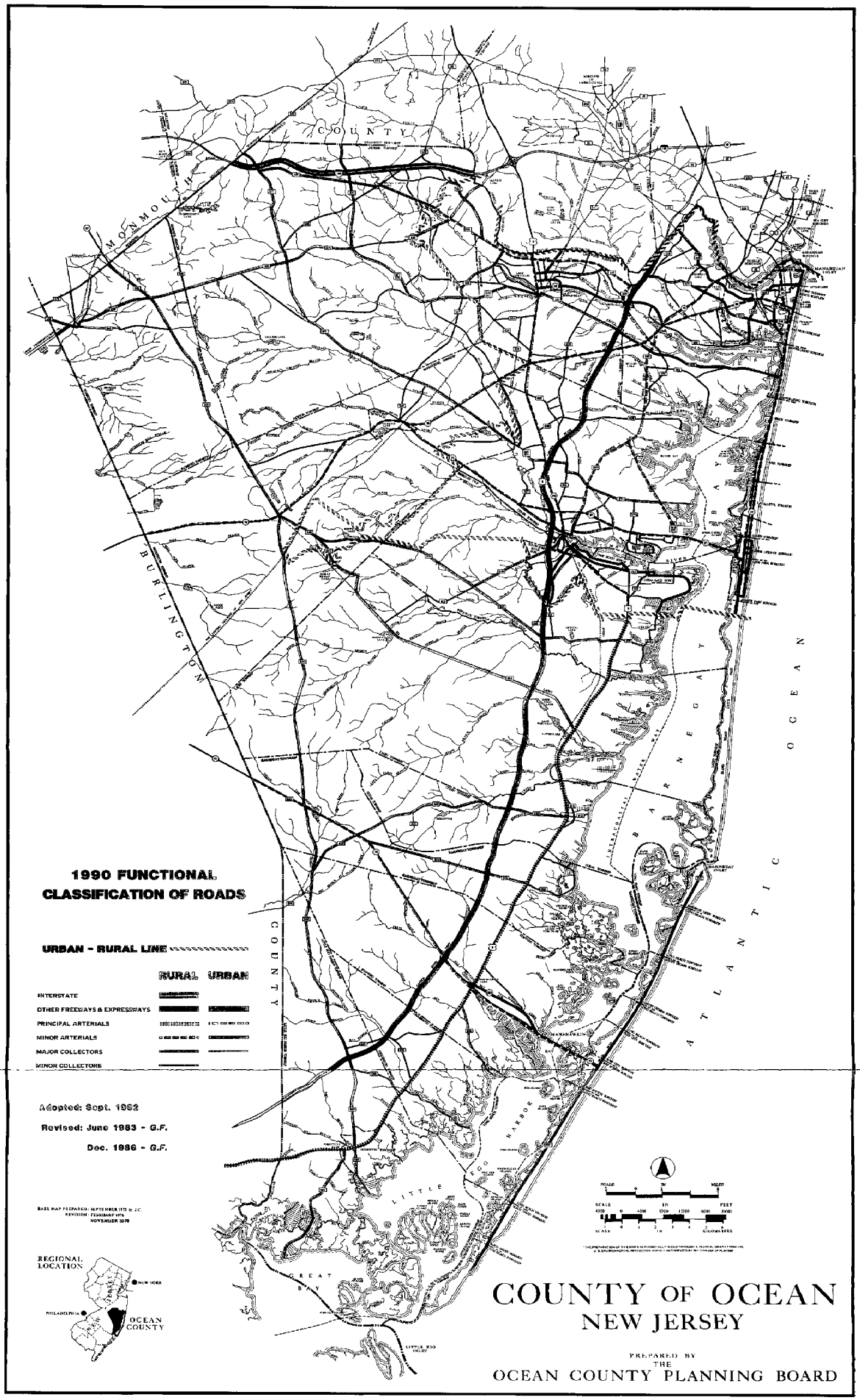

MONMOUTH COUNTY
BURLINGTON COUNTY
ATLANTIC OCEAN
BARNEGAT BAY
1990 FUNCTIONAL CLASSIFICATION OF ROADS
URBAN - RURAL LINE
RURAL
URBAN
INTERSTATE
OTHER FREEWAYS & EXPRESSWAYS
PRINCIPAL ARTERIALS
MINOR ARTERIALS
MAJOR COLLECTORS
MINOR COLLECTORS
Adopted: Sept. 1992
Revised: June 1993 - G.F.
Dec. 1996 - G.F.
REGIONAL LOCATION
NEW YORK
PHILADELPHIA
OCEAN COUNTY
COUNTY OF OCEAN
NEW JERSEY
PREPARED BY
THE
OCEAN COUNTY PLANNING BOARD

Table 2-14
1990 Functional Classification of Highways and Streets

Roadway Classification	Total Miles	Percent
Rural System		
Principal Arterial	32	2.7
Minor Arterial	61	5.3
Collector (major and minor)	219	18.8
Local Road	851	73.2
Subtotal	1,163	100.0
Urban System		
Principal Arterial	98	8.2
Minor Arterial	96	8.1
Collector Street	102	8.6
Local Street	895	75.1
Subtotal	1,191	100.0
Ocean County Total	2,354	100.0

Source: NJ Department of Transportation, Bureau of Statewide Planning, 1985.

Functional classification has been further refined through the designation of rural and urban areas. This designation is based on the 1980 Census figures and considers the degree of urbanization, intensity of development and population density of a community. The urban and rural designation is used primarily for determining eligibility for federal funding assistance under the Federal Aid to Urban Systems Program. This designation also determines areas eligible for federal transit - related funding under the Section 18 - Rural Transportation Program. The preceding table presents the 1990 functional classification and mileage characteristics for Ocean County.

There are two roadways in the County classified as freeways, Interstate 195 and the Garden State Parkway. Interstate 195 extends across northern Jackson Township and provides east-west access between Trenton and southern Monmouth County. It also provides a connection to Interstate 295, the NJ Turnpike, US Route 9 and the Garden State Parkway. Two full interchanges are located in Jackson Township, providing access to County Routes 527 and 571.

The Garden State Parkway is the major north-south arterial roadway in the County, extending 37 miles from Brick Township to Little Egg Harbor Township. Opened to traffic in 1954, the Parkway is a limited access toll road that runs from the New York State border to Cape May. It provides connections to the state's major east-west arterials including Interstates 195 and 287, the NJ Turnpike and the Atlantic City Expressway. There are a total of twelve interchanges in Ocean County, three of which provide full access. The roadway has three lanes in each direction between exit 91 in Brick Township to exit 83

in Dover Township. South of Dover Township, the Garden State Parkway contains two lanes in each direction.

Principal arterials in the County primarily include State roads although several County roadways fulfill this function in the urban area. Major east-west routes include NJ Route 88, NJ Route 70, NJ Route 37 and NJ Route 72. The major north-south route is US Route 9, which is primarily a two lane highway. Several County roadways are classified as principal arterials including a portion of Routes 526, 549 and 549 Spur. All of these highways are major traffic arteries which carry large volumes of traffic. They provide primary access to other intra and inter-County locations. A series of minor arterials are also included in the highway network. These roadways exhibit similar characteristics to principal arterials except that they handle shorter trips and lower traffic volumes.

The collector system consists of both major and minor roadways. Major collectors serve as important intra-County travel corridors, linking larger settlements with principal arterial facilities. They also provide access to major trip generators within the County. Minor collectors provide service through smaller communities and channel local traffic in rural areas to the major collector and arterial systems.

The Garden State Parkway, a major arterial highway, is a principal factor in the County's development.

The remaining roadways are classified as local roads and comprise over one-half of the County's total road network. The primary purpose of the local street is to provide access to property abutting the public right-of-way. These roads are primarily residential in nature. The majority of local roads are owned and maintained by the municipality, although some County roads are classified as local streets in several of the older communities throughout the County.

Mass Transit

Mass transportation in Ocean County consists of both bus and rail passenger service. In addition to NJ Transit, the region's primary service provider, there are also a variety of private bus carriers. Inter-County transit operators serving Ocean County according

to level of service include NJ Transit, Suburban Trails, Academy Bus Lines, Asbury Park - New York Transit and Monmouth Bus Lines.

Bus service in the Route 9 Corridor originates primarily from the Toms River and Lakewood terminals. Service is provided by NJ Transit, Suburban Trails and Academy Bus Lines to four major destinations including midtown and downtown Manhattan, Newark and Jersey City. A variety of service options are available including direct service, and combinations of direct and local service.

Additional bus service is provided via the Route 35 Corridor beginning in Point Pleasant Beach by Asbury Park - New York Transit and Academy Bus Lines. Asbury Park - New York Transit provides express and local service to the Port Authority Bus Terminal in New York, while Academy Bus Lines runs express service to Wall Street.

The new Toms River Transportation Center is a major facility serving public transit in Ocean County.

A total of 8 year-round, long-haul bus routes are operated in Ocean County. Since 1984, Monmouth Bus Lines has operated the County's only local bus route, the M-29, which links Toms River with the Ocean County Mall, Brick Plaza and Point Pleasant Beach. NJ Transit service to the Atlantic City area has been significantly improved following the initiation of express service to Toms River and Lakewood destinations.

During the summer months, bus service as well as innovative bus-rail service combinations are greatly expanded to meet the transit demand of seasonal visitors and residents. Frequent service is provided to popular resort locations such as Great Adventure, Long Beach Island, Island Beach State Park, Point Pleasant Beach, Seaside Heights and Bay Head.

Ocean County Transportation Program

In 1986, the County Transportation Department initiated a series of transportation service improvements targeted to the needs of senior and disabled residents. Existing County-run transit services were restructured to integrate the Section 18 Rural Transportation Program, the Senior Citizen and Disabled Resident Transportation Assistance Program and the County's Handicapped and Elderly Transportation Program.

Current services were developed as part of a comprehensive planning effort. The service concept considered a variety of factors such as service types (fixed-route, demand-responsive and door-to-door), trip purpose, trip length and population density factors. The new system was developed in conjunction with the Board of Chosen Freeholders and the County's two transportation advisory committees.

Three distinct types of transportation service are provided under the County Transportation Program. Fixed-route bus service is provided to the more developed areas of the County such as Berkeley, Brick, Dover, Lakehurst and Lakewood. In 1987, the County operated 8 local bus routes. The routes have been located where eligible riders are concentrated and provide transportation to shopping, recreation, medical and governmental facilities. They also connect with existing public transit facilities such as the Dover and Lakewood terminals. Supplemental service for the disabled is also provided on an advance notice.

The Ocean County Transportation Program provides a variety of transit services to County residents.

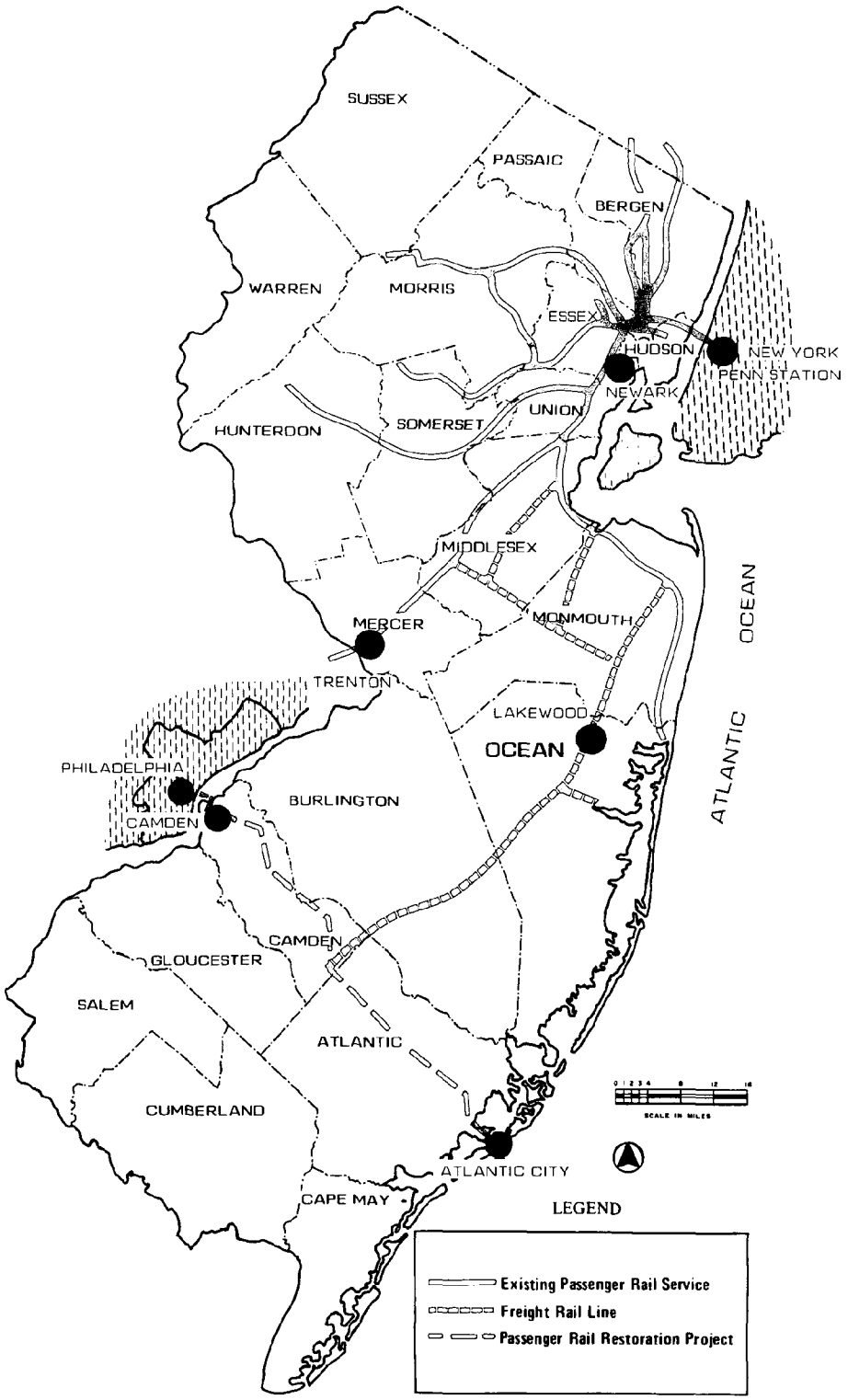
Demand responsive service has been initiated in rural portions of the County such as Jackson, Plumsted, and on Long Beach Island. Requests for service are routed by an office dispatcher who develops a daily, pick-up schedule based on the clients geographic location.

The third service component provides door-to-door transportation and is known as the Ocean County Handicapped and Elderly Transportation Service or OCHETS. This service is provided free to eligible clients for non-emergency medical purposes. OCHETS, which began in 1977, was the first transportation service operated by the County. This component has expanded significantly; during 1986 approximately 2,300 clients per month were transported to and from medical facilities in the Ocean County area.

Passenger Rail

Passenger rail service is provided by NJ Transit along the North Jersey Coast Line. Passenger terminals, which include park-ride facilities are located in Point Pleasant Beach and Bay Head, the terminus of the rail link. NJCL service is powered by diesel locomotive

Figure 2-18
Selected Passenger and Freight Rail Facilities



from Matawan south to Bay Head. The rail service provides direct access to Penn Station in Newark where a transfer can be made to the PATH system to reach New York City and Jersey City destinations. Frequent service is provided for commuters to northern New Jersey and New York City during the morning and evening peak. The map on the preceding page illustrates the rail network in Ocean County and the state.

Park and Ride

Specific measures have been implemented to make public transit more competitive in attracting Ocean County riders. Services have been improved and expanded for the public's convenience. A variety of support features such as park-ride, terminal facilites, bus shelters and appropriate signing have also been initiated throughout the region. Ocean County has park-ride facilities located in the following municipalites; Lakewood, Toms River, Bay Head, Point Pleasant Beach and Lacey. The Toms River and Lakewood facilities are located in the central business district of their respective communities. While these facilites are currently used to access bus service, the facilities are located near existing rail lines which provides the potential for expanded passenger rail service.

Rail Freight

Rail freight service in Ocean County is operated by Conrail along the Southern Branch and Toms River Branch. Regular service is provided along the Southern Branch from Woodmansie, Burlington County to Red Bank, Monmouth County where the rail line joins the North Jersey Coast Line. Service is also provided along the Toms River track which diverges from the Southern Branch at Lakehurst and terminates in Toms River.

Freight operations generally cater to the industries concentrated in the Toms River Industrial Park, the Lakewood Industrial Park, and most recently to a reactivated sand and gravel facility located in Woodmansie, Burlington County.

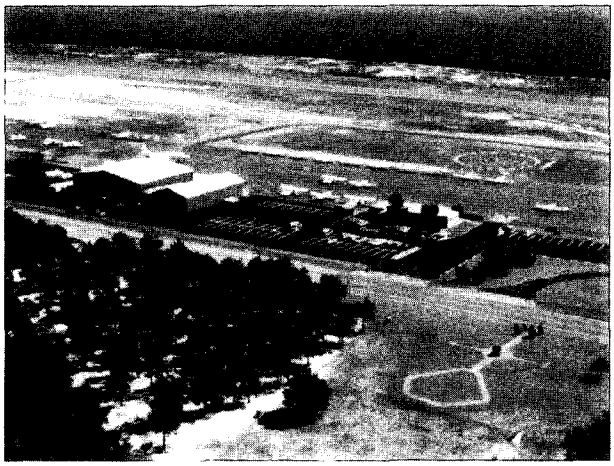
A 25 mile portion of the Southern Branch track between south Lakewood and Red Bank is being upgraded to Class II, Freight Rail Standards under an agreement involving the NJ Department of Transportation, Conrail, Monmouth and Ocean Counties and a private corporation. A total of $2,000,000, divided equally between the State and Conrail will be used to complete track rehabilitation along this route.

Airport Facilities

Airports are classified by the types of aircraft they can accomodate. Four airport

facilities are located within Ocean County. The major facility, Lakehurst Naval Air Engineering Center located in Manchester Township is a military base and closed to civilian use. Lakewood Airport is a privately owned, general utility airport designed to serve intermediate size, light aircraft and is located in Lakewood Township. It has a single paved runway extending 2,600 feet excluding overruns. The runway is equipped with low intensity lighting, runway end identification lights and an approved instrument approach. The Manahawkin Airport, located in Stafford Township, is a similar facility.

Robert J. Miller Airpark is a County owned facility located off Route 530 in Berkeley and Lacey Townships. Classified as a basic transport airport, the facility is capable of serving most types of aircraft except for certain airliners. It has a single, paved runway (6-24) which extends 4,872 feet in length and 40 feet in width. The airpark also has two paved overruns of 600 feet at the south end and 478 feet at the north end of the runway. The total paved runway length is 5,950 feet and is oriented at 60° and 240°. This runway has medium intensity lighting and runway identification lights. A taxiway parallels the runway for its full length and extends 40 feet in width. The Robert J. Miller Airpark is also equipped with a four box visual approach slope indicator at the termini of runway 6-24. A full ILRS landing system is being completed at the Airpark for improved safety and operations.



The Robert J. Miller Airpark provides comprehensive service facilities for most types of aircraft.

Waterways

Waterways served as the original transportation routes of the County. Although waterways have declined as a mode of general transportation, they are in popular demand as routes for pleasure boating, recreational fishing and for the County's commercial fishing fleets. The primary water route is the Intracoastal Waterway which extends along the coast from the Manasquan River to Great Bay and provides a charted route south to the Florida coast.

The Intracoastal Waterway includes the Point Pleasant Canal and provides access to various navigable channels throughout the bay and river system. The Canal has a design

channel of six feet in depth and 100 feet in width. The County's two major inlets, Barnegat Inlet and the Manasquan Inlet provide direct access to the Atlantic Ocean. Construction and maintenance activities to the inlets are the responsibility of the US Army Corps of Engineers. Dredging for many of the County's navigable channels fall under State jurisdiction.

Bikeways

A renewed interest in bicycle travel has spurred an increased demand for bicycle facilities. Most bicycle riding activities involve recreational riding, sport and touring riding. There are two Class 2 bike lanes in Ocean County which offer restricted rights-of-way designated for the exclusive use of bicycles. The Princeton Avenue bikeway was completed in 1979 in conjunction with a County roadway improvement project. The route extends four miles along the Metedeconk River in Brick Township. The Long Beach Island facility is also a Class 2 route. It extends along the shoulder of Long Beach Boulevard in Beach Haven Borough.

Several of the parks in Ocean County including Winding River Park in Dover Township and Island Beach State Park have also constructed bikepaths. In Winding River, these facilities permit shared use of the right-of-way by pedestrians and bicyclers. In addition, the roadway shoulders of many County collectors and arterials have sufficient lane sharing capacity to accomodate bikeways.

WASTEWATER TREATMENT FACILITIES

There are three techniques used for sewage treatment and disposal in Ocean County. Advanced wastewater treatment is provided by public wastewater collection and treatment facilities and private collection and package treatment plant facilities. Individual and community onsite treatment and disposal facilities, primarily septic systems, are also used. These include alternative design systems such as the RUCK and pressure dosing systems. Systems such as waterless toilets and composting designs are also used, primarily in the less densely populated areas of the County under the jurisdiction of the Pinelands Commission.

Passage of the Federal Water Pollution Control Act Amendments of 1972, which established the Section 201 Construction Grants Program, provided Federal subsidies for the construction of regional wastewater treatment facilities and municipal collection systems. In Ocean County a regional treatment system has been constructed by the Ocean

County Utilities Authority to transport and treat wastewater collected by municipal systems. This system provides secondary treatment of wastes at three County owned and operated treatment plants. Treated effluent is discharged to the Atlantic Ocean via outfalls that extend approximately one mile offshore. The treatment capacities of this system are presented in the following table.

Table 2-15
Ocean County Wastewater Treatment Facilities

Facility	Location	Design Capacity (mgd)	Average Flow (mgd)	Remaining Capacity (mgd)	Treatment Level
Northern	Brick	28.0	15.0	13.0	Secondary
Central	Berkeley	24.0	16.0	8.0	Secondary
Southern	Stafford	20.0	6.0	14.0	Secondary
Ortley Beach	Dover	12.0	0.0	12.0	Off-Line

Source: Ocean County Utilities Authority, 1986.

There are approximately 35.0 MGD of excess treatment capacity at the OCUA facilities. This excess capacity represents a significant resource in accommodating new development. It should be noted that a portion of this capacity is required to provide treatment for peak flows which occur during the summer months due to the tremendous influx of seasonal population.

Package treatment plants are usually associated with large scale residential developments and are intended to provide temporary treatment facilities until public facilities are available. Public and institutional uses which are remote from the regional system may also rely on these types of facilities.

The Federal Water Pollution Control Act Amendments of 1972 also established areawide agencies to plan for the overall protection and management of an area's water resources. The New Jersey Water Quality Planning Act [NJSA 58:11A-1] designated the Board of Chosen Freeholders as the areawide agency for Ocean County. The Ocean County Areawide Water Quality Management Plan was prepared and adopted by the County in 1980 and has been conditionally certified by the Governor of New Jersey and approved by the Region II Administrator of the US Environmental Protection Agency. Pursuant to these Acts, all sewerage facility plans must be in conformance with the Areawide WQMP and all permits issued under the New Jersey Pollutant Discharge Elimination System must also conform to the plan.

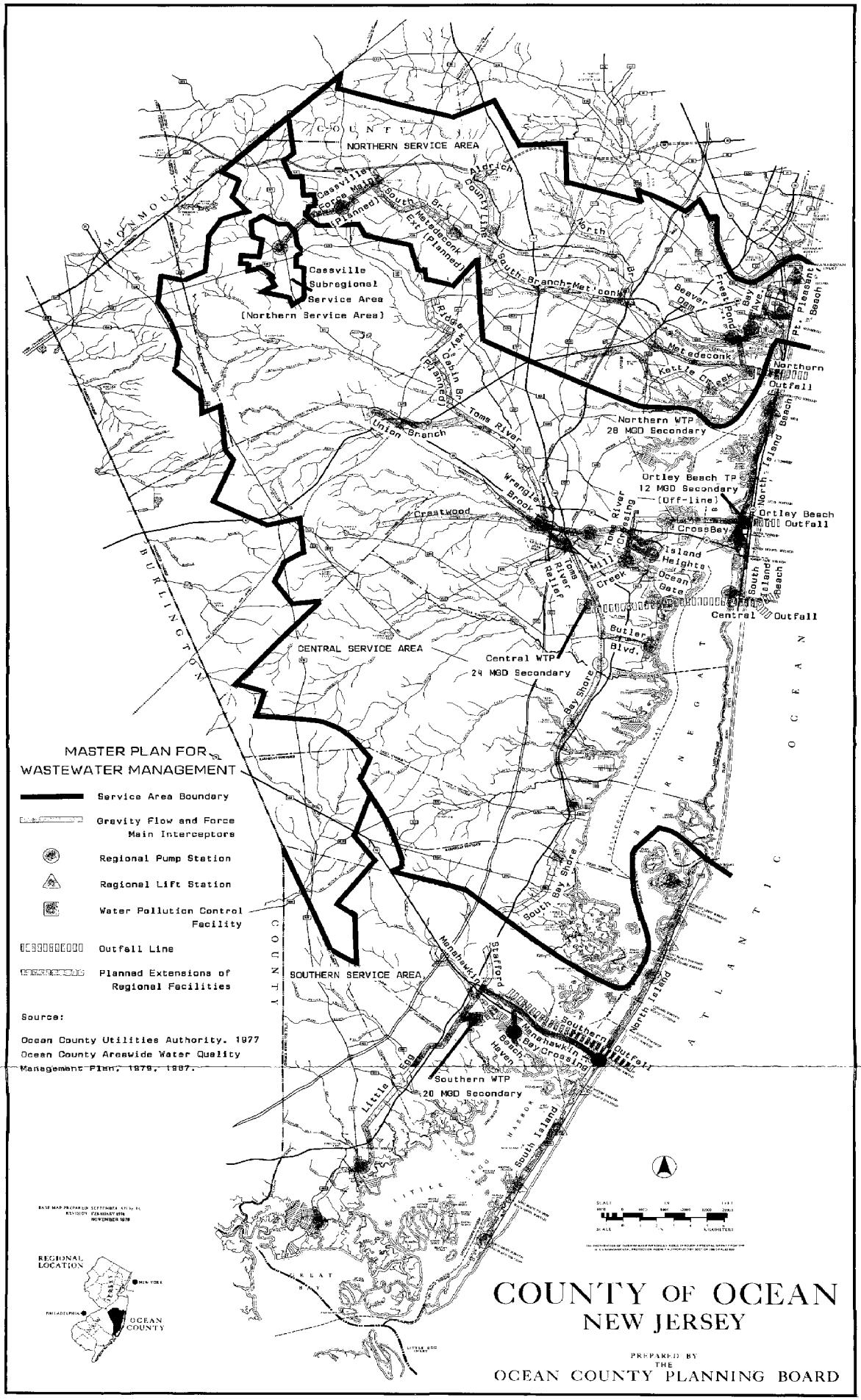
The Ocean County Areawide WQMP generally provides for the extension of public wastewater treatment facilities to connect with package systems to eliminate both point source discharges to inland water bodies and land application of treated effluent. Implementation of the Areawide WQMP will result in the continued operation of package treatment plants only where it is not cost effective to connect to a public system. New package systems are inconsistent with the Areawide WQMP. The Pinelands Comprehensive Management Plan also prohibits new point source discharges in the Pinelands Area. Areas serviced by public or private wastewater treatment facilities appear on the map on the following page.

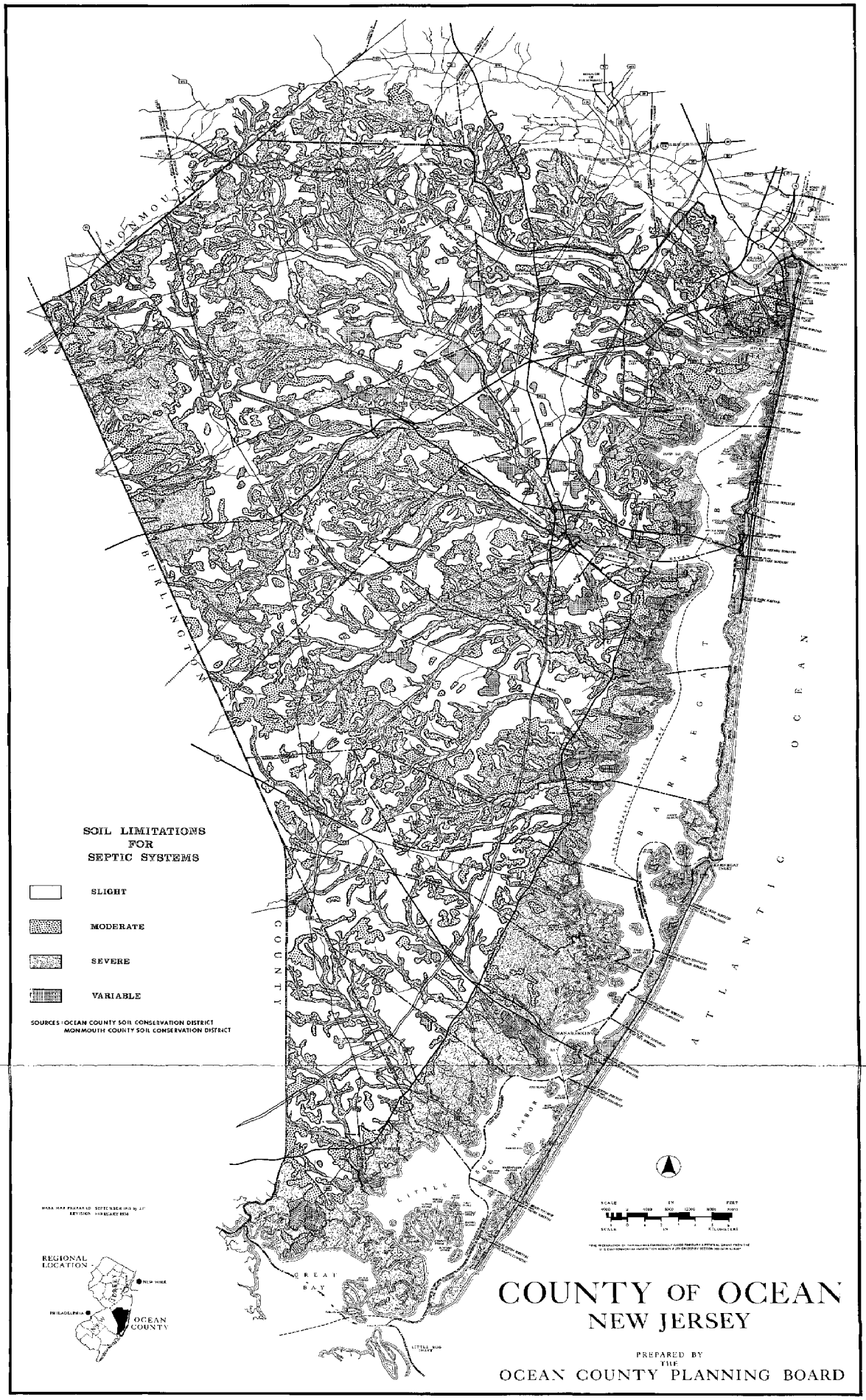
The septic system is the primary method of onsite wastewater treatment in low density areas of Ocean County or in areas where wastewater treatment facilities are planned but not yet constructed. In a standard septic system, the septic tank functions to remove most of the suspended solids through sedimentation. Anaerobic conditions in the septic tank initiate chemical and biological alteration of sewage constituents. Partially renovated effluent is then discharged to the soil via a drainfield, which distributes the effluent load to the soil. The soil provides limited additional treatment of the wastewater before its loss to either evapotranspiration or deep percolation.

Certain soils in Ocean County have limitations related to their suitability as septic tank absorption fields. These limitations are dependent upon permeability and percolation rates, soil texture, depth of the water table and slope. A map designating areas with soil limitations for septic systems is included on a following page.

Alternative technologies to the standard septic system for onsite treatment have been increasingly relied on to meet stringent water quality requirements in certain areas of the County. The most common alternative design is the waterless or composting toilet. In these facilities, sanitary waste is treated biologically with no discharge of wastewater. These systems rely on a leach field for disposal of household washwater. The RUCK System is primarily a septic system with additional capacity for removing nitrogen compounds. It is anticipated that alternative systems will play a very limited role in wastewater treatment in Ocean County, although such systems may be useful in meeting Pinelands Commission requirements for new housing in restrictive land capability districts such as Forest Areas.

Residuals, the material remaining after wastewater treatment and the discharge of treated wastewater effluent includes sewage sludge and septage pump-out wastes. In 1986, approximately 23 dry tons of sludge per day were processed by OCUA treatment facilities. For the summer peak population, the OCUA estimates that 32 dry tons per day are treated. Sludge wastes are currently disposed of in landfill facilities. However, the OCUA has approved plans to construct a $43 million treatment facility designed to


NORTHERN SERVICE AREA
Cassville Subregional Service Area
(Northern Service Area)
Cassville Force Main (Planned)
South Br. Metedeconk Ext. (Planned)
Ridge & Cabin Br. (Planned)
Northern WTP
28 MGD Secondary
Ortley Beach TP
12 MGD Secondary
(Off-line)
Northern Outfall
Ortley Beach Outfall
Central Outfall
CENTRAL SERVICE AREA
Central WTP
24 MGD Secondary
SOUTHERN SERVICE AREA
Southern WTP
20 MGD Secondary
Southern Outfall
MASTER PLAN FOR WASTEWATER MANAGEMENT
Service Area Boundary
Gravity Flow and Force Main Interceptors
Regional Pump Station
Regional Lift Station
Water Pollution Control Facility
Outfall Line
Planned Extensions of Regional Facilities
Source:
Ocean County Utilities Authority. 1977
Ocean County Areawide Water Quality Management Plan, 1978, 1987.
REGIONAL LOCATION
NEW YORK
PHILADELPHIA
OCEAN COUNTY
COUNTY OF OCEAN
NEW JERSEY
PREPARED BY
THE
OCEAN COUNTY PLANNING BOARD


MONMOUTH
BURLINGTON
COUNTY
BARNEGAT BAY
ATLANTIC OCEAN
GREAT BAY
LITTLE EGG HARBOR
SOIL LIMITATIONS
FOR
SEPTIC SYSTEMS
SLIGHT
MODERATE
SEVERE
VARIABLE
SOURCES: OCEAN COUNTY SOIL CONSERVATION DISTRICT
MONMOUTH COUNTY SOIL CONSERVATION DISTRICT
REGIONAL
LOCATION
NEW YORK
PHILADELPHIA
OCEAN
COUNTY
COUNTY OF OCEAN
NEW JERSEY
PREPARED BY
THE
OCEAN COUNTY PLANNING BOARD

convert sewage sludge into a dry fertilizer additive using the patented Carver - Greenfield process. The plant will include four storage silos and will be located at the Central Wastewater Treatment Plant in Berkeley Township. Operation of the new sludge treatment facility is expected by 1990. The facility is intended to handle the sludge the County generates through the year 2005.

The OCUA also operates two facilities for the treatment and ultimate disposal of septage pump-out wastes. The primary facility, with a treatment capacity of 70,000 GPD is located at the Central Wastewater Treatment Plant. A smaller facility with a capacity of 15,000 GPD is located at the Southern Wastewater Treatment Plant. These facilities have adequate capacities to treat and dispose of all the septage pump-out wastes generated in Ocean County.

SOLID WASTE

Currently, Ocean County generates approximately 1,150 tons per day of various categories of solid waste. Approximately 60 percent of this total is residential wastes. Waste from commercial and industrial firms represents an additional 35 percent. The remaining five percent is a mixture of nonresidential, municipal, agricutural, institutional and sewage sludge. These figures are based on a solid waste volume and composition study conducted in 1984. In 1986, approximately ten percent of the solid waste generated in the County was recycled while the remaining waste is disposed of in landfills. In 1986, three landfill facilities were in operation. Each facility is privately owned.

The New Jersey Solid Waste Management Act (NJSA 13:1E-1), requires Ocean County to develop a plan for the environmentally sound management and disposal of solid waste generated within the County. The original Ocean County District Solid Waste Management and Resource Recovery Plan was adopted by the Board of Chosen Freeholders in 1979. The Plan was subsequently amended in 1980, 1981, 1984 and most recently in 1986. The County Plan has been adopted by the Board of Chosen Freeholders and approved by the Commissioner of the NJ Department of Environmental Protection. Under the plan, all solid waste generated within the County which is not recycled must be disposed of at environmentally secure landfills until resource recovery facilities are available.

The Ocean County District Solid Waste Management Plan contains three major componets. These include a landfill management plan which provides for two regional state-of-the-art, lined landfills; a comprehensive recycling program designed to promote increased recycling efforts; and, a resource recovery element which presents a timetable of key milestones necessary to construct and operate a resource recovery facility by 1992.

The County Plan designates two waste districts for the County. The northern district contains twenty municipalities and is served by the Ocean County Landfill located on Route 70 in Manchester Township. The southern district comprises thirteen municipalities and is served by the Southern Ocean County Landfill located on Route 532 in Ocean Township. Each regional facility is privately owned and operated and contains lined cells and a leachate collection system. The third landfill, the James H. James Landfill in Brick Township, is designated for closure.

Recycling activities throughout the County have increased significantly in recent years. During 1982 eleven municipalities recycled nearly 10,000 tons of material. By 1985, a total of twenty-one municipalities recycled 40,300 tons of material. In 1986, approximately ten percent of the County's total solid waste stream was recycled. The most prevalent recyclable materials include newspaper, asphalt, corrogated paper, leaves, auto scrap, ferrous metals, motor oil, non-ferrous metals and glass.

Recycling facilities will play an increasingly important role in managing the County's solid waste.

The third component of the Ocean County District Solid Waste Management Plan contains an implementation schedule for the construction and operation of a resource recovery facility. This schedule is also reflected in an Administrative Consent Order executed between the Board of Chosen Freeholders and the Department of Environmental Protection. The proposed facility will utilize mass burn technology to incinerate solid waste to generate steam and produce electricity. A 1986 amendment to the County Plan designated a site for the resource recovery facility near Route 532 in Ocean Township. The site was chosen based on a careful evaluation of siting criteria and was recommended by two Ocean County advisory committees, the Citizens Advisory Committee on Resource Recovery and the Solid Waste Advisory Council. The Board of Chosen Freeholders has formally adopted the site designation and it has been approved by the Commissioner of the Department of Environmental Protection. The resource recovery facility is scheduled to be under construction by 1990 and operational by 1992.

HAZARDOUS WASTE

The term hazardous waste identifies those wastes that pose a danger to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed. Specific criteria for designation of hazardous waste have been established by the US Environmental Protection Agency. In 1980, the passage of the Comprehensive Environmental Response, Compensation and Liability Act, commonly known as Superfund provided for federal resources to clean up environmental hazards posed by abandoned or designated hazardous waste disposal sites.

The National Priorities List prepared by the US Environmental Protection Agency contains an inventory of the most serious hazardous waste sites throughout the Nation. The list presents those sites which are initially scheduled for clean-up measures through federal Superfund assistance. In 1986, the NJ Department of Environmental Protection released a Superfund status report which identified 97 New Jersey hazardous waste sites. Of these, twelve sites are located in Ocean County. The table below presents the twelve sites by municipality, in terms of their ranking on the New Jersey list.

Table 2-16
Ocean County Hazardous Waste Sites on the National Priorities List

Site Name	Location	Ranking on List
Brick Township Landfill	Brick Township	12
Reich Farm	Dover Township	17
Toms River Chemical Company(2)	Dover Township	25
Naval Air Engineering Center(1)(2)	Manchester Township	28
Goose Farm(2)	Plumsted Township	37
Spence Farm	Plumsted Township	43
Pijak Farm	Plumsted Township	47
Beachwood-Berkeley Wells(2)	Beachwood Borough and Berkeley Township	55
Denzer and Schafer X-Ray Company(2)	Berkeley Township	61
Jackson Township Landfill	Jackson Township	64
Hopkins Farm	Plumsted Township	82
Wilson Farm	Plumsted Township	83

Notes: (1)Federal facility site which qualified separately on the National Priorities List.
(2)Remedial Investigation Feasibility Study underway.
Source: NJ Department of Environmental Protection, Division of Waste Management, New Jersey Hazardous Waste Sites on the National Priorities List, May 1986.

OPEN SPACE, PARKS AND RECREATION

Ocean County has an extremely rich diversity of natural resources. These natural resources have been traditionally utilized to meet the recreational needs of County residents and the hundreds of thousands of visitors who vacation in Ocean County each year. Governments at all levels have a responsibility for meeting the public need for recreational facilities, parks and open space. Private enterprise, in the form of campgrounds, canoe rentals, boardwalks and amusement centers also plays an important role in fulfilling the demand for recreation.

In Ocean County, a hierarchy of public recreational facilities have been established by the County, state, federal and municipal governments. The Federal government supports several activities that contribute to the development of a variety of outdoor recreational facilities. The US Army Corps of Engineers is responsible for the Intracoastal Waterway and the County's two improved inlets. These water facilites serve as the backbone for the boating, commercial and recreational fisheries industry in the County. The US Coast Guard also maintains a full range of boating services associated with the Intracoastal Waterway and other navigable waters.

"Old Barney" at Barnegat Light State Park, is a familiar landmark to County residents and visitors.

The Barnegat Division of the Edwin B. Forsythe National Wildlife Refuge and the Holgate Unit of the Brigantine National Wildlife Refuge preserve important fisheries and wildlife habitat and provide for passive recreation. Extensive tracts of land under military jurisdiction in Ocean County also play an important role in preserving open space.

The Federal government further provides matching funds from several programs for acquisition of land and development of facilities by State, County and municipal governments. These funds are particularly important for capital intensive projects such as inlet, waterway and beach maintenance and protection. Designation of the Pinelands National Reserve in Section 502 of the National Parks and Recreation Act of 1978 has resulted in funding for public acquisition of significant acreage in the Pinelands Area of Ocean County especially in the Cedar Creek basin.

Three divisions within the NJ Department of Environmental Protection are responsible for State recreational facilities. Each division serves different objectives. The Division of Parks and Forestry is responsible for managing State parks which provide recreational activities and State forests which include forestry, conservation and limited recreational uses. The Division of Fish, Game and Wildlife administers wildlife management areas which stress hunting, fishing and nature-oriented recreation. The following page presents major Federal and State land holdings in Ocean County.

The NJ Office of Green Acres is an important State agency which coordinates and develops open space and recreation acquisition programs at the State level. The Green Acres funding program provides matching grants to Counties and local governments for facility development and land acquisition. Funds for this program are received from five State Green Acres Bond issues which total $675 million.

The County's 40 miles of ocean beaches are enjoyed by residents and thousands of visitors each summer.

The County role in public recreation is to acquire, develop and maintain park facilites that are broader in scope than municipal facilities. It also administers a public recreation program that addresses the needs of all segments of the County's population. As of 1986, the County has fifteen recreational facility sites totalling more than 3,000 acres and two conservation areas, Gull Island and the Metedeconk River Conservation area which comprise 366 acres. The County facilities vary greatly in terms of available recreational activities and size and are generally well distributed close to existing residential centers. While several of these facilities are small, they provide important public access to the waterfront. During the mid-1980's, the County acquired six new park sites with State and Federal assistance. The major new recreational and conservation sites include Wells Mills Regional Park located in Ocean Township, the Forge Pond Golf Course and Recreation Area located in Brick Township, and the Metedeconk River Conservation Area located in Brick and Lakewood. The County in 1986 authorized the purchase of a county park facility in Jackson Township to serve area residents. The Department of Parks and Recreation is proceeding with the identification and acquisition of an appropriate site. The following figure presents a location map and profile of County park facilities and the recreation activities they provide.

Table 2-17
Major Federal and State Land Holdings in Ocean County

Ownership and Land Use	Name of Facility	Acres
Federal:		
Military Base	Lakehurst Naval Air Engineering Center/Fort Dix	23,398
Wildlife Area	Barnegat Division of the Edwin B. Forsythe National Wildlife Refuge	10,747
State of New Jersey:		
Fish and Wildlife Management Areas	Butterfly Bog	103
	Colliers Mills	12,368
	Forked River Game Farm	538
	Great Bay Boulevard	4,671
	Greenwood Forest	17,621
	Manahawkin	965
	Manasquan River	190
	Manchester	2,397
	Pasadena	3,409
	Prospertown Lake	140
	Quail Farm	289
	Stafford Forge	2,789
	Whiting	1,190
Forests	Bass River	4,818
	Lebanon	11,575
Marinas	Forked River	13
Miscellaneous	Colliers Mill Tract	115
Natural Areas	Great Bay	395
	Swan Point	147
Recreation Areas	Manasquan Canal	5
	Warren Grove	431
State Parks	Barnegat Light	31
	Double Trouble	5,026
	Island Beach	5,030
	Federal Acres	34,145
	State Acres	74,256
	Total Acres	108,401

Sources: 1. NJ Department of Environmental Protection, Division of Parks and Forestry, Green Acres Program.
2. US Fish and Wildlife Service, 1986.

Figure 2-21

Publicly Owned Lands

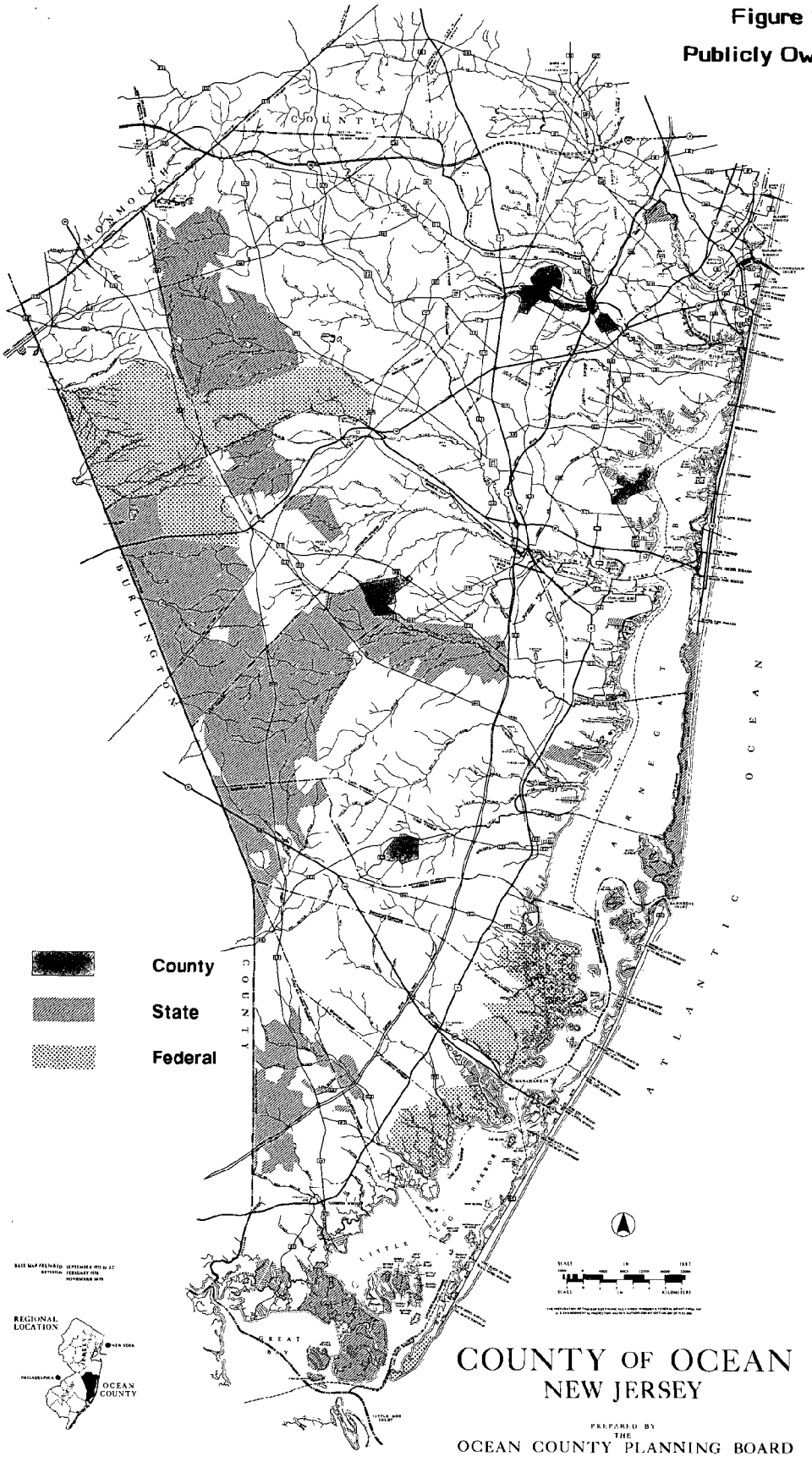
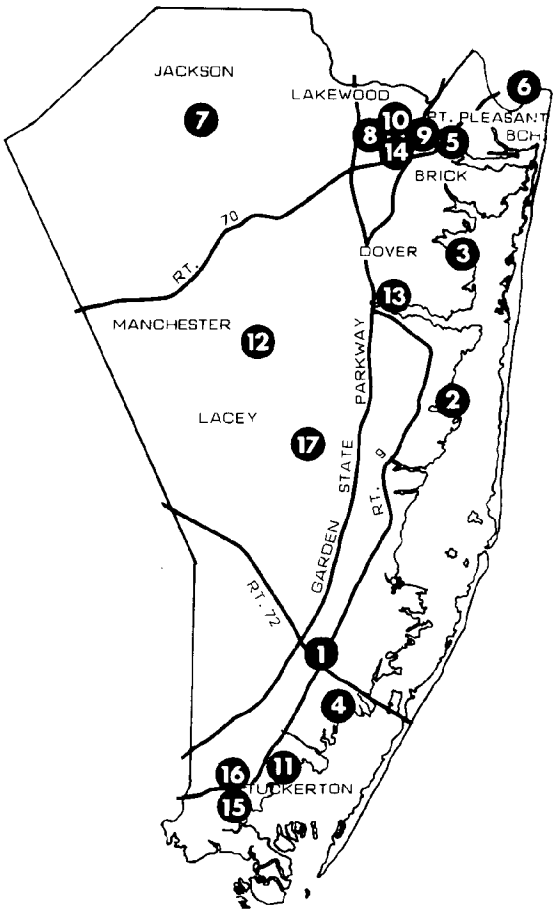


Figure 2-22
Ocean County Park Facilities Map

Park Locations	Facility



Total Acres: 3,886.7

1. **A. Paul King Park.** 61 ac.; Stafford. Multiple use park.
2. **Berkeley Island Park.** 25 ac.; Berkeley. Fishing, crabbing, bathing.
3. **Cattus Island Park.** 497 ac.; Dover. Nature center, trails, picnic area.
4. **Cedar Run Park.** .48 ac.; Eagleswood. Fishing, crabbing, boat launching area.
5. **Forge Pond Recreation Area.** 300 ac.; Brick. Golf course, canoeing, passive recreation.
6. **Gull Island Conservation Area.** 48 ac.; Pt. Pleasant Beach. Undeveloped park on tidal wetlands.
7. **Jackson County Park.** 216 ac.; Jackson. Proposed County park.
8. **Lake Shenandoah Park.** 143 ac.; Lakewood Multiple use park.
9. **Metedeconk River Recreation Area.** 413 ac.; Brick and Lakewood. Fishing, canoeing, trails.
10. **Ocean County Park.** 323 ac.; Lakewood. Picnicking, hiking, playing fields.
11. **Parkertown Park.** 3 ac.; Little Egg Harbor. Fishing, crabbing, playground.
12. **Robert J. Miller Airpark.** 944 ac.; Berkeley and Lacey. County fair grounds, open play area, trails.
13. **Riverfront Landing Park.** 1.2 ac.; Dover. Picnic area.
14. **Shenandoah Sports Field Complex.** 84 ac.; Lakewood. Sports fields, picnic area, trails.
15. **South Green Street Park.** 5 ac.; Tuckerton. Fishing, picnicking, boat launching area.
16. **Stanley H. "Tip" Seaman Park.** 22 ac.; Tuckerton. Multiple use park.
17. **Wells Mills Regional Park.** 801 ac.; Ocean. Passive recreation, conservation areas.

Source: Ocean County Parks Department, 1987.

CHAPTER 3

PLANNING FOR THE FUTURE, LAND USE AND POLICY

INTRODUCTION

The pattern of growth and development directly affects the social and physical environment. As the County's population continues to increase and additional land areas are developed, the overall organization of land becomes an important factor in the quality of life. Well-planned, productive living spaces are as critical a resource for County residents as traditional natural resources such as water and air.

This chapter of the Comprehensive Master Plan presents the Planning Board's recommendations for the future development of Ocean County. It is the most important section of the Plan. Previous sections of this report have dealt with past or existing conditions. While positive efforts can be made to correct specific problems that have been identified or to resolve apparent conflicts that exist, there is little that can be done to reverse past decisions or circumstances that have resulted in the present settlement pattern of Ocean County. The future however, can be greatly influenced by various planning programs conducted by the municipalities, the County and its agencies and regional, state and federal bodies. The intent of the land use and policy recommendations of the Master Plan is to build on the many positive aspects of the County's past, and to avoid future problems that in hindsight have become apparent both in Ocean County and in other parts of the State and Nation.

It is the belief of the Planning Board that this can be achieved by using the Master Plan as a comprehensive policy statement on which land use, capital improvements and other decisions influencing the location and intensity of new development can be based. A coordinated and consistent process of decision-making by the municipalities, the County and its agencies and state and federal bodies will contribute to a logical and manageable settlement pattern for Ocean County.

Initially, however, it is necessary to define a series of goals and objectives to serve as a framework for future decision-making and planning. Planning itself can be best described as a process, or series, of related actions and decisions that move toward the accomplishment of specified objectives. The achievement of the goals and objectives embodied in the Master Plan will require consistency in decision-making at all levels of government, as well as the private sector. They must therefore be acceptable to all levels of government, public agencies and the private sector whose cumulative efforts and activities will create the future character of Ocean County.

The following section presents a set of planning goals and objectives which address the major issues and influences that collectively impact Ocean County. This section forms the basis for the creation and implementation of specific programs and actions designed to achieve the more generalized goals and objectives.

PLANNING GOALS AND OBJECTIVES

Environmental and Natural Resources

Goal

Continue coordinated and consistent County-wide policies to preserve, maintain and enhance the County's natural resources and encourage the adoption of similar policies by municipalities and state and federal agencies.

Objectives

- Maintain and enhance the quality and quantity of the County's surface water, including lakes, streams, rivers, estuaries and coastal waters and groundwater resources.
- Preserve coastal and freshwater wetlands in their natural state to ensure the continual recharge of essential elements required for the maintenance of the marine food chain, to preserve water quality and to receive the natural benefits of flood protection provided by these areas.
- Preserve the flood hazard area along streams and rivers in a natural state to protect the public from the dangers of flooding, to preserve water quality and to protect the sensitive flora and fauna associated with these areas.
- Preserve, protect and restore the beaches and dune systems of the barrier beaches.
- Encourage the development of less costly measures for beach protection and waterway stabilization, including continued use of simultaneous inlet dredging and beach restoration as a cost effective means to maintain channels and inlets and to restore beaches.
- Encourage strict enforcement of the legislative ban on ocean dumping of sewage sludge, and support the prohibition of ocean disposal of any radioactive waste.
- Encourage federal legislation to designate responsibility and provide adequate funding for the development and implementation of alternative disposal techniques for industrial, hazardous and toxic wastes which would permit elimination of all ocean dumping.
- Promote the development of offshore oil and gas reserves to meet national needs consistent with the provisions of the Outer Continental Shelf Lands Act,

the Tanker Safety Act and the requirement for the use of best available and safest technologies in the exploration and production of these reserves.

- Preserve, protect and enhance the many diverse plant and animal communities and their habitats, environmentally sensitive areas and naturally scenic areas from inappropriate use or development.
- Preserve and protect the existing high quality air resources that greatly enhance the County's overall environment.
- Preserve the Pinelands Preservation Area and other portions of the Pinelands Protection Area that exhibit the essential quality of the Pinelands from inappropriate use or development in recognition of the value of this resource to the State and Nation.

Regional Development

Goal

Continue to provide a coordinated management program to control the spatial development of the County by directing new growth to environmentally suitable areas which can be provided with essential infrastructure and support facilities.

Objectives

- Identify land areas suitable for residential, commercial and industrial development sufficient to accommodate reasonable projections of future needs.
- Recommend an efficient, energy conserving development pattern.
- Promote new development that is consistent and compatible with existing settlement patterns.
- Promote the retention of prime open agricultural lands and the enhancement of production agriculture and agricultural related businesses.
- Encourage participation in state programs designed to promote the preservation of agricultural land including the use of restrictive easements.
- Provide technical assistance to County and municipal agencies in designating agricultural development areas and in preparing consistency determinations on development proposals and capital improvement projects.
- Resolve inconsistencies with the land use recommendations of the Pinelands Comprehensive Management Plan that result in conflicts between County and

municipal land use policies, while achieving the Pinelands Protection Act goal of accommodating future development needs while protecting the essential resources of the Pinelands.

- Recommend land uses and development patterns in the area adjacent to the Oyster Creek Nuclear Generating Station that reflect an understanding of the special public safety, buffering and evacuation requirements needed for such facilities.
- Promote the continued development and expansion of recreational facilities at all levels of government to meet the recreational needs of existing and future residents and encourage the maintenance of open space and the protection of sensitive environmental features.

Housing Opportunities

Goal

Promote the provision of a broad range of housing opportunities for all income levels and household types by encouraging the maintenance or rehabilitation of the existing housing stock and through the construction of new housing units.

Objectives

- Promote the continued construction of quality single family homes suitable for a range of income levels.
- Encourage the construction of multi-family and apartment, townhouse and manufactured home units in either rental, cooperative, condominium or fee simple ownership for all age groups, household types and income levels.
- Encourage the expansion of existing public low-income and senior citizen housing opportunities and consider the need for the creation of regional housing authorities.
- Discourage buildings of five or more stories on the barrier beaches, in areas of ten feet or less elevation or within 1,000 feet of any tidal areas.
- Support the strict enforcement of municipal property maintenance codes including specific regulations for conversion of seasonal dwellings to year-round housing.
- Encourage participation in programs designed to promote the maintenance and rehabilitation of housing, including low interest loans, grants and tax incentives.

The Transportation Network

Goal

Promote the development of an improved and balanced, multi-modal transportation system which integrates the highway system with bus, rail, air and waterborne transport systems.

Objectives

- Continue the development and maintenance programs for an efficient and effective intra-County highway system to service existing and future traffic needs.
- Develop transportation plans and programs which reduce negative impacts on the environment such as requirements to reduce hydrocarbons, carbon monoxide and nitrogen oxide emissions from automobiles.
- Provide a balance between land use and transportation systems which will support regional transit systems such as density standards for suburban rail and bus service.
- Promote the development of multi-modal transportation centers in downtown Lakewood and Toms River with adequate parking capacity and establish additional park and ride facilities at appropriate locations throughout the County.
- Encourage the expansion of efficient, integrated and coordinated transportation services that address the specialized needs of the elderly and disabled by operating a range of transportation services.
- Encourage public and private efforts to retain and rehabilitate the existing rail network and to prevent rail freight line abandonments which result in the permanent loss of facilities and support the retention of transportation rights-of-way which may be beneficial for future passenger rail use.
- Promote transportation improvements that will encourage increased inter-regional goods movement especially along the existing rail network where adequate excess capacity exists.
- Support the restoration of passenger rail service between Lakewood and the metropolitan region.
- Improve and expand the facilities at the Robert J. Miller Airpark to meet increased operational and safety requirements and to service growing demand.
- Improve waterborne transportation by encouraging navigational surveys, the implementation of regular maintenance dredging of state and federal waterways

to their authorized width and depth, maintenance of channel markers and other navigation aids and through structural improvements to the inlets.

Historic, Cultural and Natural Features

Goal

Continue to develop a cohesive identity for Ocean County through the preservation of historical, cultural and natural features by drawing on the unique community identities of constituent municipalities.

Objectives

- Maintain the tangible evidence of our County's history, including buildings, objects and man-impacted landscapes through preservation, restoration, continued use or adaptive reuse.
- Promote the sense of identity and vitality maintained by the County's many varied neighborhoods and communities by encouraging the development of compatible and related uses within those areas.
- Maintain and enhance the County's waterfronts to preserve the County's maritime heritage.

Economic Development

Goal

Continue the economic development efforts of the County to reduce unemployment, provide year-round employment opportunities and enhance the tax base by encouraging compatible industrial and commercial operations to locate or expand in Ocean County.

Objectives

- Assist and cooperate in the promotion and development of industrial parks which are sponsored by municipal industrial commissions.
- Encourage the expansion or location of light, clean industrial firms, office, research and development firms in areas that are capable of being serviced by regional facilities and infrastructure.

- Provide a climate favorable for economic development in Ocean County through continued cooperation with the municipalities and by mobilizing the private sector.
- Maintain working relationships with federal and state and municipal officials in Ocean County involved with economic development activities.
- Establish and maintain an economic development data base to provide prompt and reliable responses to prospective industries and their consultants.
- Support the efforts of the Industrial Pollution Control Financing Authority in making available reduced interest loans to industries to provide for the expansion or construction of pollution control facilities in order to promote economic development while protecting the environment.
- Participate in the development of promotional activities in conjunction with County agencies and advisory councils, municipalities and trade associations to enhance the resort industry in the County.
- Conduct feasibility and other technical studies addressing economic development issues associated with airports, transportation facilities, public capital improvements, natural resources and other related issues.

Human Resources Programs

Goal

Achieve a balanced, responsive, effective and efficient human resources program within the County through the coordination, integration and improvement of public and private health, welfare and social programs.

Objectives

- Maintain and improve regional services provided by the County, including the County Library System, County Health System and County educational facilities represented by Ocean County College and the Vocational Educational Schools, and the County Social Services Systems.
- Continue to support County, State and private agencies in identifying the medical needs of the County's residents and to promote the establishment or expansion of hospital, acute care and other health facilities required to meet those needs.

Capital Improvements

Goal

Continue a coordinated and consistent program of capital improvements and public investments necessary to provide the infrastructure and public services required to meet the needs of existing and future County residents.

Objectives

- Complete the construction of the regional wastewater treatment system and encourage the construction of municipal and private collection systems to service existing and future development.
- Continue the planned expansion of County educational facilities including Ocean County College and vocational schools to meet the needs of future County residents.
- Continue the planned improvements to the transportation system provided for in the Transportation Improvement Program and adopted Capital Improvement Program.
- Implement the program for the environmentally sound disposal of solid waste and resource recovery provided for in the approved Ocean County District Solid Waste Management Plan and Amendments.

FUTURE POPULATION

Population growth requires the increased use of developable land and potentially the intensified use of land in areas that are already developed. An increased population will also place additional demands on public infrastructure and facilities and require expansion of public services. Therefore, it is necessary to have a reasonable projection of future population growth when preparing land use recommendations and identifying probable growth areas. Population projections are also a valuable planning tool for projecting future needs in areas such as water supply, wastewater treatment and transportation.

Table 3-1 on the following page presents population projections for Ocean County and its municipalities through the year 2000. These projections are based upon the Low Population Series prepared as part of the Ocean County Water Quality Management Plan in 1978. The initial projection was completed using the cohort-survival projection

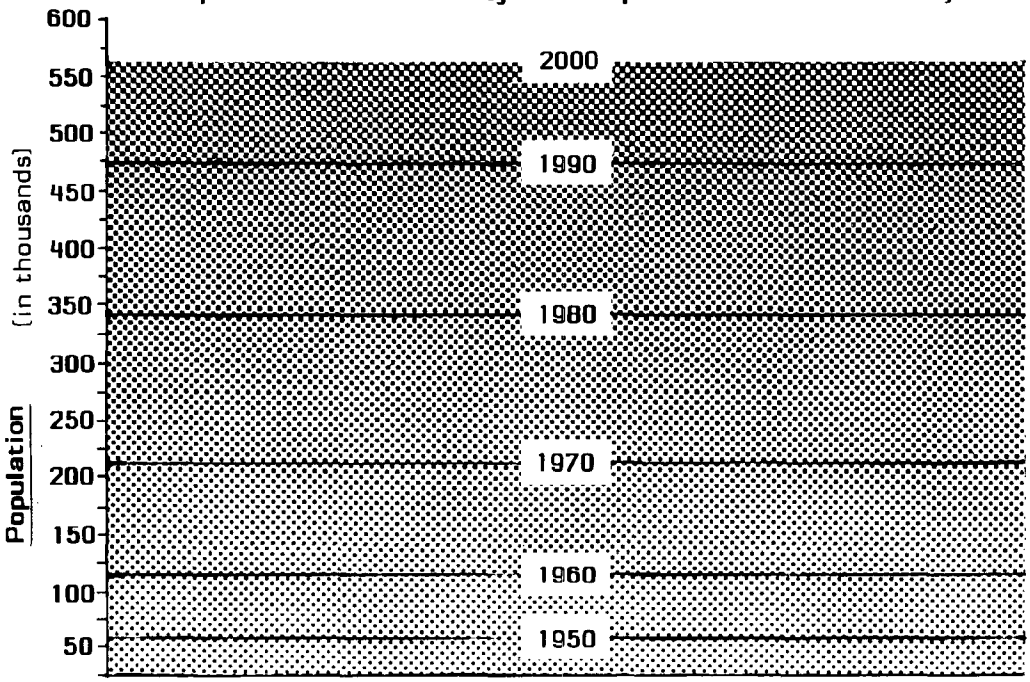
Table 3-1
Population Projections for Ocean County Municipalities

Municipality	1980 Population	1990 Projected Population	1990 Change	1990 Percent	2000 Projected Population	2000 Change	2000 Percent
Barnegat	8,702	12,450	3,748	43.1	18,000	5,550	44.6
Barnegat Light	619	850	231	37.3	1,000	150	17.6
Bay Head	1,340	1,600	260	19.4	1,800	200	12.5
Beach Haven	1,714	2,200	486	28.4	2,600	400	18.2
Beachwood	7,687	8,500	813	10.6	9,000	500	5.9
Berkeley	23,151	36,000	12,849	55.5	48,000	12,000	33.3
Brick	53,629	70,000	16,371	30.5	75,000	5,000	7.1
Dover	64,455	75,000	10,545	16.4	85,000	10,000	13.3
Eagleswood	1,009	2,000	991	98.2	3,000	1,000	50.0
Harvey Cedars	363	450	87	24.0	550	100	22.2
Island Heights	1,575	1,750	175	11.1	1,900	150	8.6
Jackson	25,844	40,000	14,356	56.0	51,000	11,000	27.5
Lacey	14,161	22,500	8,339	58.9	25,000	2,500	11.1
Lakehurst	2,908	3,500	592	20.4	3,600	100	2.9
Lakewood	38,464	47,500	9,036	23.5	53,500	6,000	12.6
Lavallette	2,072	2,450	378	18.2	2,700	250	10.2
Little Egg Harbor	8,483	12,600	4,117	48.5	16,100	3,500	27.8
Long Beach	3,488	5,500	2,012	57.7	7,000	1,500	27.3
Manchester	27,987	46,000	18,013	64.4	53,000	7,000	15.2
Mantoloking	433	500	67	15.5	550	50	10.0
Ocean	3,731	7,500	3,769	101.0	10,800	3,300	44.0
Ocean Gate	1,385	1,500	115	8.3	1,700	200	13.3
Pine Beach	1,796	2,200	404	22.5	2,400	200	9.1
Plumsted	4,674	9,000	4,326	92.6	12,000	3,000	33.3
Point Pleasant	17,747	20,700	2,953	16.6	22,000	1,300	6.3
Point Pleasant Beach	5,415	6,300	885	16.3	6,800	500	7.9
Seaside Heights	1,802	2,000	198	11.0	2,100	100	5.0
Seaside Park	1,795	2,500	705	39.3	2,700	200	8.0
Ship Bottom	1,427	1,800	373	26.1	2,200	400	22.2
South Toms River	3,954	4,000	46	1.2	4,000	0	0.0
Stafford	10,385	17,500	7,115	68.5	30,000	12,500	71.4
Surf City	1,571	1,750	179	11.4	1,900	150	8.6
Tuckerton	2,472	3,000	528	21.4	3,500	500	16.7
County Total	346,038	471,100	125,062	36.1	560,400	89,300	19.6

Sources: US Census Bureau; NJ Department of Labor, Building Permit Reports.

technique. Net migration, historically the most important factor in the County's growth, was assumed to decrease over the length of the projection period. A review of recent growth rates, development activity and other growth-related issues indicated that the Low Population Series projection of 560,400 persons in Ocean County by the year 2000 continues to be reasonable figure for the County. It is interesting to note that the County figure is comparable to the year 2000 Preferred Projection of 555,400 persons prepared by the NJ Office of Demographic and Economic Analysis.

Figure 3-1
Population Trend and Projected Population of Ocean County



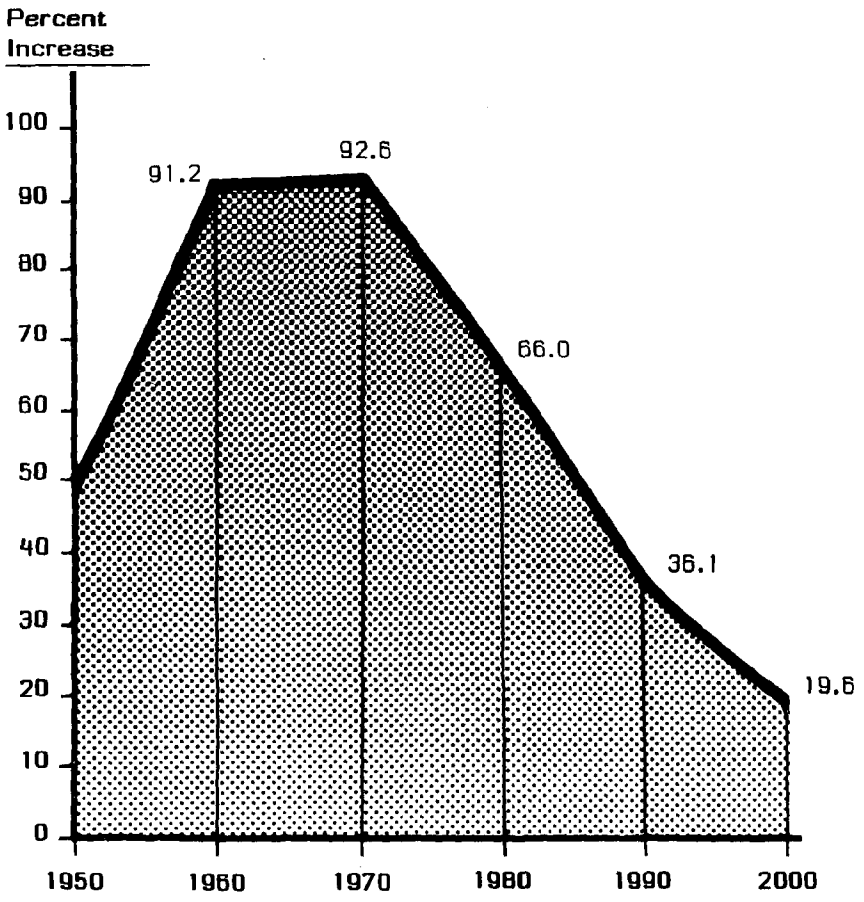
Sources: US Bureau of the Census, Census of Population, 1980.
Ocean County Areawide Water Quality Agency, 1978.
Ocean County Planning Board, 1986.

While the WQMP figure for the County as a whole represents a reasonable projection of future growth, it was necessary to adjust the municipal distributions to account for unanticipated growth rates in some municipalities as reported by the 1980 Census. Other local growth incentives such as conversion of seasonal units to year-round occupancy, construction of wastewater treatment facilities and other public services, the availability of developable land and the individual municipality's growth policies toward additional development have also been considered in making these adjustments. Particularly important were local or regional land use policies and regulations embodied in revised

municipal master plans and the Pinelands Comprehensive Management Plan as indicators of future growth potential.

Ocean County is expected to continue to grow over the next two decades. The year 2000 population figure will represent a 62 percent increase over the 1980 population, or an additional 214,362 County residents. However, these figures generally represent a slowing of growth, both real and as a percentage, over the population increases experienced during the period of 1950 through 1980 when the County's population increased by 511 percent. The following section summarizes the expected population changes projected for areas of the County.

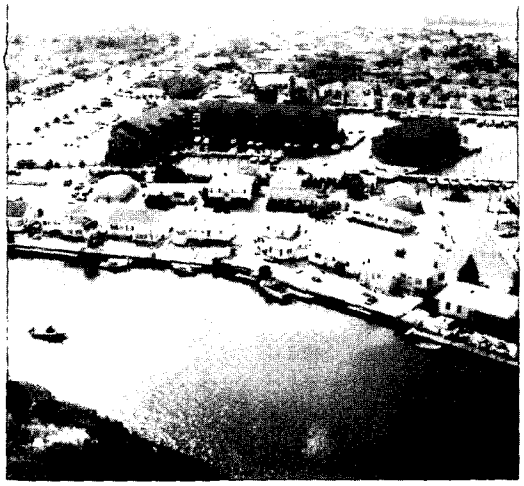
Figure 3-2
Percent Increase of Population of Ocean County



Sources: US Bureau of the Census. Census of Population, 1980.
Ocean County Areawide Water Quality Agency, 1978.
Ocean County Planning Board, 1986.

The **barrier beach communities** will continue to have small but steady population increases. Coastal municipalities such as Bay Head, Mantoloking and Barnegat Light are now essentially developed and increases will result primarily from the conversion of seasonal units to year-round and limited infill. There are still substantial numbers of developable lots in the larger island municipalities such as Long Beach Township and these will continue to be utilized. Some municipalities have indicated an acceptance of higher density housing, such as condominiums and townhouses, which have a potential to substantially increase population. Others have moved to limit this type of development.

On the **mainland**, the smaller municipalities such as Island Heights, Ocean Gate and Pine Beach face similar restrictions in the number of available building lots. Some growth is expected from conversion of larger, older homes to multi-family. Most development will be associated with infill and small scale construction which has been encouraged by the completion of sewerage systems. Beachwood, which has an undeveloped section west of the Garden State Parkway designated as a regional growth district by the Pinelands Commission is expected to see increases when sewers are available in this area.



High density development may increase the population of the developed beach communities.

The **northeastern municipalities**, such as Brick and Point Pleasant, which have been traditional leaders in population growth are expected to slow substantially. This reflects a shortage of vacant land without environmental constraints. Brick's most recent growth has largely been associated with the expansion of adult communities. Higher density development such as townhouse and multi-family will play an increasing role in these communities. Lakewood Township is expected to record relatively steady increases associated with the expansion of residential development on the periphery of "downtown" Lakewood. Lakewood's successful economic development program, its ongoing redevelopment program and its emerging role as a transit center should influence its continued development.

The **central and northern municipalities** of Berkeley, Dover, Jackson and Manchester are projected to record the greatest increases in population. These municipalities have

large areas of developable land and the necessary infrastructure to service growth. Jackson in particular has a tremendous growth potential because of its access and land area, much of which is not under the jurisdiction of regional regulatory programs such as the Pinelands or CAFRA. The extension of sewer service in Jackson will play an important role in shaping this community.

The **southern municipalities** will be heavily influenced by State land use regulations, particularly the Pinelands Commission's requirements. Lacey Township is particularly impacted with most of its land area west of the Garden State Parkway designated as Preservation Area. Stafford Township contains a large area designated as a regional growth district. The completion of sewers is expected to allow increased growth and the Manahawkin area is expected to emerge as the commercial growth center of southern Ocean County. Little Egg Harbor will continue to be influenced by housing pressures from Atlantic City, as will Tuckerton and Eagleswood to a lesser extent. Barnegat's growth rate is expected to slow substantially from that experienced since 1970, when it led all County municipalities in terms of a percentage increase. Ocean Township's growth rate is also expected to increase.

FUTURE HOUSING AND LAND USE NEEDS

An important element in the Comprehensive Master Plan is the provision of an adequate supply of land in areas which can best accommodate new development to meet the needs of County residents, and those persons within the region that may reasonably be expected to locate here. A significant determinant of the future land use requirements of Ocean County is the estimate of housing demand.

The primary factor in terms of housing demand is the anticipated increase in the number of households. Household increase is a function of two separate parameters: population increase and demographic change in the existing population. The national trend indicates that the population will continue to increase as a result of natural population change and net migration. More importantly the size of households is expected to continue to decrease resulting in a demand for housing greater than would occur merely as a result of population increases. Single households and the elderly comprise an increasingly important segment of the housing market.

The County reflects this nationwide trend. In 1970 the average household size was 3.01 persons. By 1980 the average household size for the County decreased to 2.67 persons. Correspondingly, there was a large increase in the number of households in the County, increasing from 68,362 in 1970 to 128,304 households in 1980. It is anticipated

that the average household size for Ocean County will continue to decrease over the planning period of the Comprehensive Master Plan. Therefore, the provision of housing during this period must reflect the natural increase of the County's residential population as well as the regional demand reflected by net migration. Housing demand must also consider the impact of continued decreases in household size, primarily young, single person households and senior citizen housing.

It can be assumed that the rate of change in the average household size for Ocean County will approximate that experienced since 1970. Based on that assumption, it is projected that there will be an increase of 53,675 households by 1990 compared to 1980. By 2000 there will be an additional 44,650 households. An increase in the number of households represents a concomitant increase in the demand for additional housing. In view of the County's past trends in housing occupancy, it can be anticipated that the amount of new housing required in Ocean County by the year 2000 will total 98,325 dwelling units. An adequate area of developable land must be reserved to accommodate this estimate of housing need.

The passage of the Fair Housing Act in 1985 has focused attention on the need to provide housing opportunities for low and moderate income households. The Fair Housing Act established an independent Council on Affordable Housing which designated housing regions for the State and provided estimates of present and projected needs for low and moderate income units. Ocean and Monmouth Counties comprise Housing Region 4. This region is expected to provide 23,247 low and moderate income dwellings by the year 1993. Of this total, Ocean County must provide 9,174 units.

Responsibility for implementing 'fair share' housing falls on the individual municipality. The municipality must prepare a valid housing plan and incorporate this element into the municipal master plan. In addition, municipal zoning and land development ordinances must provide appropriate land area with necessary infrastructure to accommodate low and moderate income development. The provisions of the Act also provide for the formulation of Regional Contribution Agreements which enable municipalities to transfer up to 50 percent of their 'fair share' of housing to another willing municipality within the same region.

An increase in the demand for additional housing units also results in an increase in non-residential development as well. This demand can be formulated into land requirements based on land use type, producing totals for the amount of land required within a selected time frame. Again, projections of land use requirements are primarily based upon the projection of population increase.

Table 3-2

Land Use Standards For Ocean County

Land Use Type	Acres Per 1000 Persons
Residential	96.0
Business and Commercial	12.0
Industrial	7.5
School and Educational	5.0
Public and Quasi-Public	13.0

Source: Ocean County Areawide Water Quality Management Plan, 1978.

The existing land use survey can be used to derive acreage demand standards for Ocean County. These standards appear in Table 3-7. It is important to note that these figures represent the amount of land that will actively be used for each land use purpose and are therefore conservative numbers. A residential development for example, may dedicate a percentage of its land area to open space, thereby removing that property from consideration for future development. This consideration is especially important in the Pinelands Area where new development will be constructed at very low densities in most land capability districts. The additional land use requirements associated with the projected population growth for Ocean County appear in the following table.

Table 3-3

Projected Land Use Requirements For Ocean County: 1990, 2000

Land Use Type	Projected Acreage 1990	2000	Total
Residential	12,178	8,696	20,874
Business and Commercial	1,500	1,072	2,572
Industrial	938	670	1,608
School and Educational	625	447	1,072
Public and Quasi-Public	1,625	1,161	2,786
Total	16,866	12,046	28,912

Source: Ocean County Planning Board, 1982.

ENVIRONMENTAL ANALYSIS AND SITE TYPES

The natural resource inventory contained in the basic studies of the Master Plan provides extensive information on the physical characteristics of Ocean County. Population, Land Use and Environmental Resources, an element of the Ocean County Areawide WQMP analyzed available natural resource information and identified areas within Ocean County which would be desirable for development from the standpoint of environmental suitability and protection. This analysis involved the careful evaluation of over 20 detailed maps illustrating the spatial extent of physical features such as soil characteristics, topography, vegetation and geology that are essential for consideration in land use planning.

The environmental analysis followed a methodology called **site typing**. According to this methodology, areas were first identified that exhibited homogeneous physical characteristics. These areas were termed site types. The significant physical features of each site type, such as soils, drainage, plant species and so forth, were subsequently examined and rated according to the degree of constraint they would impose for varying intensities of development. Each site type was then ranked according to its composite development capability. Finally, general land uses which were considered to be most suitable for particular site types were identified and environmental protection measures associated with development or use of each site type were presented.

In total, 11 site types were identified for Ocean County. Nine were derived based upon surficial natural features. They were **Tidal Wetlands, 100 Year Flood Prone Areas, Lowland Forest, Lowland Non-forest, Dwarf Forest, Prime Open Agricultural Lands, Upland Forest, Upland Non-forest,** and **Extractive.** The 2 remaining site types, **Developed Land** and **Public Land,** were determined from existing land uses and from lands owned by public agencies. Since these areas are essentially excluded from future development their physical characteristics and capabilities were not separately analyzed.

Conspicuously absent from this list of site types is a category dealing exclusively with dune or coastal beach areas. Almost all of the land area of the barrier beaches was included in the Developed Land classification. However, small but significant dune and beach areas still remain in their natural state. Areas of natural vegetation are found in several publicly owned areas of the barrier beaches such as Island Beach State Park as well as in other beach communities where development has occurred at lower densities or where beachfront lots have remained vacant.

In their natural state, dunes protect inland communities from coastal flooding caused by storms or abnormally high tides. They also act as a critical element in the restoration

of beaches, serving as a supply of sand to replenish beach areas eroded by wave action. Dunes are stabilized by natural grasses and shrubs that are tolerant to salt. This vegetation is very sensitive to disturbance. In many areas the natural process of the dune system has been hindered by grading and removal of vegetation. However, most coastal municipalities have recognized the need to preserve the dune system and have enacted stringent regulations to prevent further destruction of dunes. In some instances, dune modifications are prohibited or require approval by the municipal engineer. Certain ordinances require the reestablishment or maintenance of dunes. Public programs to replace and/or stabilize dunes are also implemented to protect this important and sensitive resource.

The dune systems of the barrier beaches provide protection from coastal storms and replenish beaches damaged by erosion.

The Site Types map is presented on a following page. It demonstrates the concept of site typing and presents the general distribution of site types throughout Ocean County. Due to limitations of scale, the map is generalized and areas smaller than approximately 40 acres are not shown. Particular site types and certain variations of vegetation and soils cover small, isolated areas. While these areas are not mapped they may be significant. Recommendations regarding development limitations and capabilities of each area can be drawn from the text of the Master Plan. The extent and precise location on a particular site are best identified through a site inspection. In addition, more detailed environmental resource mapping, such as the Department of the Interior's National Wetland Inventory maps and the vegetation and soils maps prepared by the Pinelands Commission can be used to further refine these sensitive areas. Also, various site types frequently overlap. Tidal wetlands, for example, frequently coincide with 100 Year Flood Prone Areas. In preparing this site type map, the extent of site types reflects an order of priority in which the most sensitive site type supercedes a less sensitive designation in the event site types overlap. The approximate acreage for each site type in Ocean County is presented in Table 3-4. The specific characteristics of each designation such as hydrology, topography, soils and vegetation are summarized in Table 3-5.

Table 3-4
Approximate Site Type Acreage

Site Type	Acreage
Tidal Wetland	16,400
100 Year Flood Prone Area	47,400
Lowland Forest	46,000
Lowland Non-forest	1,000
Dwarf Forest	3,452
Prime Open Agricultural Soils	9,100
Upland Forest	89,730
Upland Non-forest	4,293
Extractive	6,406
Developed Land	90,221
Public Land	80,475
Surface Water	13,908
Total	408,385

Source: Ocean County Areawide Water Quality Management Plan, 1978.

To determine the development capabilities of each site type, the physical characteristics of each designation were analyzed in terms of the opportunities and constraints they presented to development. Generally, the physical characteristics were evaluated in terms of their limitations for certain community development uses based on the interaction of soil, vegetation and hydrologic features. Land areas without environmental constraints and designated as growth areas based on an evaluation of development opportunities and constraints were considered prime developable land. These areas were considered to be most appropriate for new development. The results of this analysis are presented in Table 3-6.

The evaluation process resulted in an overall development suitability ranking for each site type. Three categories of development suitability were defined. These are **Protection, Conservation,** and **Utilization.** Each category is described in the following section of the Master Plan.

Protection

The **Protection** category includes those site types which display severe physical constraints and exhibit few assets for development, or require high construction costs,

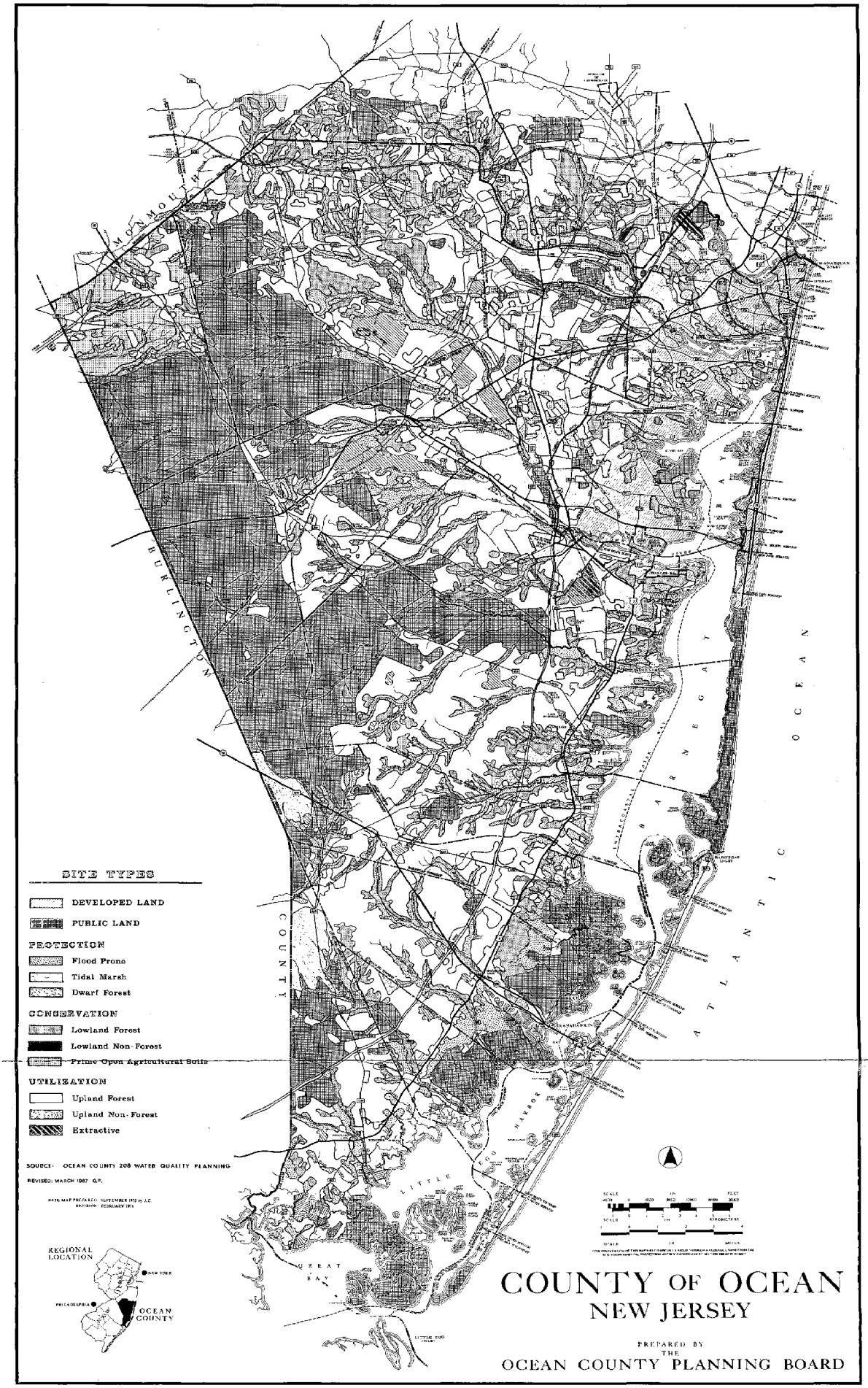

MONMOUTH
BURLINGTON
COUNTY
BARNEGAT BAY
ATLANTIC OCEAN
LITTLE EGG HARBOR
GREAT BAY
SITE TYPES
DEVELOPED LAND
PUBLIC LAND
PROTECTION
Flood Prone
Tidal Marsh
Dwarf Forest
CONSERVATION
Lowland Forest
Lowland Non-Forest
Prime Open Agricultural Soils
UTILIZATION
Upland Forest
Upland Non-Forest
Extractive
SOURCE: OCEAN COUNTY 208 WATER QUALITY PLANNING
REVISED: MARCH 1987 G.P.
REGIONAL LOCATION
NEW YORK
PHILADELPHIA
OCEAN COUNTY
COUNTY OF OCEAN
NEW JERSEY
PREPARED BY
THE
OCEAN COUNTY PLANNING BOARD

Table 3-5
Site Type Characteristics

Site Type	Hydrology		Topography	
	Flood Prone	Depth To Water Table (Feet)	Slope 0-2%-A 5-10%-C 2-5%-B 10-15%-D	Landform
Tidal Wetland	Daily	Surface	A	Coastal Lowland
Flood Prone Area	100 yr. Frequency	0-1½	A	Lowland
Lowland Forest	100 yr. Frequency	0-1½	A	Lowland
Lowland Non-Forest	100 yr. Frequency	0-1½	A	Lowland
Prime Open Agricultural Soils	No	1½-5+ (Some class III may be 0-1½)	A,B	Upland (Some class III may be lowland).
Dwarf Forest	No	5+	A,B,C	Upland
Upland Forest	No	5+	A,B,C	Upland
Upland Non-Forest	No	5+	A,B,C	Upland
Extractive	No	5+	A,B,C	Upland

Table 3-5
Site Type Characteristics (Cont.)

Site Type	Vegetation Characteristics							
	Principal Vegetation Types	Frequency	Rate of Spread	Control Resistance	Forest Fire Characteristics	Unique Plants	Root Depth	Wildlife Habitat
Tidal Wetland	Salt Meadow Cord Grass, Smooth Cord Grass	N.A.	N.A.	N.A.	None	No	Shallow	Prime
Flood Prone Area	Cedar Swamp, Hardwood Swamp, Pitch Pine Lowland	Low Low Low	Low Low Extreme	Med. Low Extreme	High None Extreme	Curley-Grass Fern, Orchids, Sundews	Shallow	Prime
Lowland Forest	Cedar Swamp Hardwood Swamp Pitch Pine Lowland	Low Low Low	Low Low Extreme	Med. Low Extreme	High None Extreme	Curley-Grass Fern, Orchids, Sundews	Shallow	Prime
Lowland Non-Forest	Chain Fern Blueberry Swamp Azalea Successive Veg. to Lowland For.	N.A.	Extreme	Low to Extreme	None	Young White Cedars-- others may appear w/ succession	N.A.	Significant
Prime Open Agricultural Soils	Principally cropland or old field succession	N.A.	N.A.	N.A.	N.A.	No	Variable	Significant
Dwarf Forest	Stunted pitch pine, blackjack, oak	6-8 yrs.	Extreme	Med.	Extreme	Stunted Forest Assoc. Broom Crowberry	Stunted	Avg.
Upland Forest	Oak/Pine, Pine/Oak Forest	16-26 yrs.	Dense Pine Med. Open Pine High	Low Oak/Pine Med.	High Med.	No	Deep	Avg.
Upland Non-Forest	Ragweed, Shrubs, Red Cedar, Sassafras, other succession to upland forest	N.A.	Extreme	Low	None	No	Variable	Sig.
Extractive	Cleared or sparse Pitch Pine or Shrubs	N.A.	N.A.	N.A.	N.A.	No	Variable	Avg.

Table 3-5
Site Type Characteristics (Cont.)

Site Type	Representative Soil Types	Soil Drainage Class	Hydrologic Soil Group	Soil Moisture Characteristics	Agricultural Capability Class	Erosion Potential (K-Factor)
			Soil Characteristics			
Tidal Wetland	Tidal Marsh	Poor	D	N.A.	VIII	N.A.
Flood Prone Area	Alluvial	Poor	D	.16-.22	Special Crops	-
	Berryland (Flooded)	Poor	D	.05	Special Crops	.17
	Muck	Poor	D	.30-.35	Special Crops	-
Lowland Forest	Atsion	Poor	D	.06-.08	Special	.17
	Berryland	Poor	D	.06-.08	Special	.17
Lowland Non-Forest	Kresson	Poor	C	.16-.22	III	.43
	Pokomoke	Poor	D	.14-.20	III	.28
	Shrewsbury	Poor	D	.18-.24	III	.28
	Colemantown	Poor	D	.18-.24	III	.43
Prime Open Agricultural Soils	Adelphia	Mod	C	.16-.20	II	.32
	Collington	Well	B	.16-.20	I(A-Scope) II(B-Slope)	.28
	Downer	Well	B	.10-.16	II	.28
	Sassafras	Well	B	.14-.18	II	.28
	Freehold	Well	B	.12-.22	I(A-Scope) II(B-Slope)	.28
	Holmdel	Mod	C	.10-.22	II	.28
	Klej	Mod	B	.05-.09	III	.17
	Pemberton	Mod	A	.12-.14	III	.20
	Pokomoke	Poor	D	.14-.20	III	.28
	Tinton	Well	A	.08-.12	III	.20
	Keansburg	Poor	D	.16-.22	III	-
Dwarf Forest	Downer, loamy sand	Well	B	.10-.16	Prime	.27
	Lakewood	Well	A	.06-.09	VII	.17
	Woodmansie	Well	B	.06-.08	IV	.20
Upland Forest	Downer	Well	B	.10-.16	III	.28
	Evesboro	Well	A	.07-.09	VII	.17
	Woodmansie	Well	B	.06-.08	VI	.20
Upland Non-Forest	Freehold	Well	B	.12-.22	I,II	.28
	Lakewood	Well	A	.06-.09	VII	.17
	Sassafras	Well	B	.14-.18	II	.28
	Hammonton	Mod	B	.10-.16	II	.28
	Lakehurst	Mod	B	.06-.09	IV	.28
	Pemberton	Mod	A	.12-.16	III	.43
	Woodstown	Mod	B	.12-.16	II	.28
Extractive	Downer, loamy sand, gravelly sub-stratum	Well	B	.10-.16	I,IV	.28
	Sassafras	Well	B	.14-.16	II	.28
	Woodmansie	Well	B	.06-.08	IV	.20

Notes: Hydrologic Soil Group classification refers to infiltration and water transmission abilities of soil groups.
A - High C - Slow
B - Moderate D - Very Slow

Agricultural Capability Class
I, II, III - denote prime agricultural capability
IV-VIII - denote less productive soils
Special refers to poorly drained areas suitable for cranberry and blueberry growing.

Table 3-6
Site Type Development Opportunities and Constraints

Site Type	Soil Limitations																															Vegetation												Hydrology						Development Capability Ranking
	Recharge and Runoff Potential (Hyd. Soil Grp.)			Agricultural Capability Class			Erosion Potential (K-Factor)			Septic System Limitations			Foundation Limitations			Lawn Limitations			Local Road Limitations			Sanitary Landfill Limitations			Unique Plants		Fire Danger			Tolerance to Disturbance			Wildlife Habitat			Flood Prone (100-Yr.)		Depth to Water Table										
	D	B	A	I, II, III	SPECIAL	IV-VII	.37-.48	.24-.37	.17-.24	SEVERE	MODERATE	SLIGHT	SEVERE	MODERATE	SEVERE	SEVERE	MODERATE	SLIGHT	SEVERE	MODERATE	SLIGHT	SEVERE	MODERATE	SLIGHT	YES	NO	HIGH	MODERATE	LOW	SENSITIVE	MODERATE	TOLERANT	PRIME	SIGNIF.	AVG.	YES	NO	0-1½	1½-4	4+								
	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	L	S	M	L	S	M	L	S	M	L	S	L	S	M	L								
Flood Prone Area		S			M			L			S			S			S			S			S			S			L			S			S			S			S							Protection
Dwarf Forest		M			L			L			L			L			S			L			S			S			S			S			L			L			L							Protection
Tidal Wetlands		S			L			N.A.			S			S			S			S			S			L			N.A.			S			S			S			S							Conservation
Lowland Forest		S			M			M			S			S			S			S			S			S			M			S			S			L			S							Conservation
Lowland Non-Forest		S			M			M			S			S			S			S			S			S			M			M			M			L			S							Conservation
Prime Open Agricultural Soils		M			S			M			M			M			M			M			S			L			N.A.			L			L			L			M							Conservation
Upland Forest		M			L			M			L			L			S			L			S			L			M			M			L			L			L							Utilization
Upland Non-Forest		M			L			M			L			L			S			L			S			L			M			L			M			L			M							Utilization
Extractive		M			L			M			L			L			M			L			S			L			N.A.			L			L			L			M							Utilization

Note: S - Severe Constraint
M - Moderate Constraint
L - Slight Constraint
N.A. - Not Available

harbor rare plants or wildlife and the development of which may present a threat to life or property. These site types received a protection ranking and included the following land categories: **Tidal Wetlands**, **100 Year Flood Prone Areas** and **Dwarf Forests**.

The **Tidal Wetlands** of New Jersey received official protection by the State with the passage of the Wetlands Act of 1970. This act controls filling, draining, dumping, construction and other activities considered to be detrimental to coastal marshes. The Wetlands Act precludes extensive development and is a major institutional factor resulting in the Protection rating of this site type. Tidal marshes are subject to continual coastal flooding and storms which present hazards to public safety and endangers property. Tidal marsh soils are wet, exhibit a low bearing capacity and high water table and are unsuitable for site development unless filled. Filling these sensitive soils irreparably alters the productive ecology of the wetland system. Tidal wetlands serve as a food source and nursery for many aquatic and terrestrial wildlife species and are capable of supporting endangered species, including the osprey and perrigrin falcon.

The vital biological role of tidal wetlands is supplemented by their ability to filter out sediment and contaminants from surface runoff and by the protection they provide to inland areas by buffering tidal floods and coastal storms. Table 3-6 shows only two categories of slight development constraints and a majority of severe constraints associated with wetland areas. The interests of both the human and natural environment are best served by designating this site type a Protection development ranking, with recommended uses such as passive recreation, wildlife management and scientific study.

Development within **100 Year Flood Prone Areas** would be exposed to continual property damage and life and health hazards from floodwaters. Urbanization of the floodplain, accompanied by filling of wet soils and the creation of impervious surfaces can intensify flood conditions. Impervious surfaces halt rainwater infiltration thereby increasing the volume of stormwater runoff. The disposition of fill in the floodplain reduces the natural flood storage area, diverting floodwaters to higher ground, creating unpredictable areas of flooding and possibly heavier flood damages in otherwise upland areas.

The flood hazard characteristic is of paramount importance in rating the development suitability of the 100 Year Flood Prone Area. In addition, it can be seen from Table 3-6 that this site type also presents numerous severe development constraints due to soil conditions, water table depth, sensitive vegetation and the presence of unique plants and rare wildlife species, resulting in its Protection ranking.

The **Dwarf Forest** presents few severe physical constraints to development other than a high forest fire frequency and severe limitations for lawns and landscaping. The

most vital considerations in its ranking stem from its scientific significance as a unique stunted plant association, the result of a particular combination of dry soils and frequent forest fires not yet fully understood by botanists. Several unique shrubs, including sand myrtle, pyxie moss, and broom crowberry are also found in the Plains. The pygmy forest is a valuable resource of nationwide significance. This site type area has a high potential for scientific study and educational and recreational uses. Development would alter the wild character of the area, would be highly visible above the stunted trees, and may disrupt the natural processes of soil, water and fire that maintain the dwarf forest in its special condition. These considerations result in its Protection ranking. The use of the Plains for permanent structures is further prohibited by the Pinelands Comprehensive Management Plan.

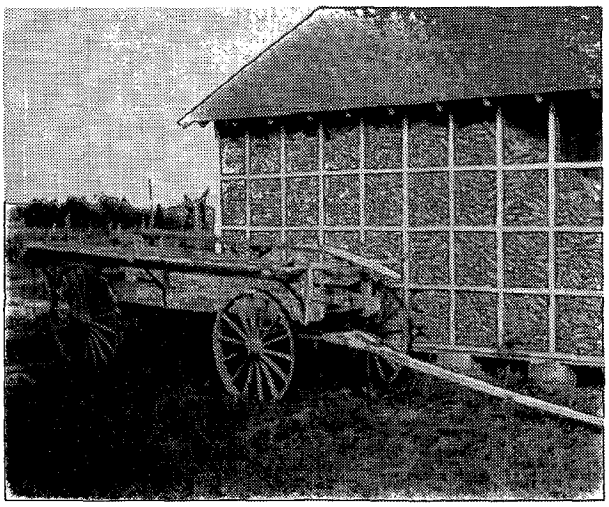
Conservation

The second category, **Conservation**, is representative of site types exhibiting special environmental considerations. Included were areas of important environmental concern which could serve as buffers between protected and developed areas. Development of these site types would be relatively expensive and most land uses would be only marginally suitable. The site types which received a Conservation ranking included the **Lowland Forest**, **Lowland Non-forest** and **Prime Open Agricultural Land**.

The development constraints presented in Table 3-6 for the **Lowland Forest** site type are similar to those of the 100 Year Flood Prone Area. Wet soils present severe limitations to septic systems, foundations, roads and lawns. Erosion potential is high to moderate resulting in high development costs. The Lowland Forest, like the 100 Year Flood Prone Area, harbor unique plants and wildlife.

This site type is generally situated contiguous to the 100 Year Flood Prone Area. Development within this site type, as compared with development in the 100 Year Flood Prone Area, would present reduced hazards to life and property. However, a flood with a frequency less than 100 years would be likely to affect this site type. It is noted that the standard Project Flood as defined by the US Army Corps of Engineers is the flood that may be expected from the most severe combination of meteorological and hydrological conditions. The Lowland Forest does present opportunities for certain types of recreational use. Expanding the greenbelt adjacent to the 100 Year Flood Prone Area would also fortify the buffer area between surface water bodies and upland development. An emphasis on low impact, low intensity uses would further help to maintain an undisturbed environment for the propagation of rare plants and animals.

The Lowland Non-forest site type possesses wet soil characteristics and accompanying septic system and building foundation restrictions which result in high development costs. Lowland Non-forest areas, particularly when developed from abandoned cranberry bogs or pond succession, may serve as nurseries for white cedar seedlings and contain other rare plant species. Filling or draining these soils would cause a change in the water table, eliminating the young cedar growth. In the Ocean County area Lowland Non-forest types, such as savannas or abandoned bogs, generally cover very small areas which further reduce development opportunities.



Farming is centered in the northwestern municipalities and continues to be an important element of local economies.

The Prime Open Agricultural soils site type is an increasingly scarce resource, both in Ocean County and throughout New Jersey. The Prime Open Agricultural soils found within the County are for the most part under active cultivation. Some areas may be in stages of succession to forest. The largest concentration of this site type occurs in the New Egypt portion of Plumsted Township. Soils composing this site type have varying limitations for development but as a whole the site type was given a moderate ranking for most development constraints.

Pressures for land development and the difficulty of profitable farming have led to a statewide decline in agriculture, which is also reflected in Ocean County. The NJ Department of Agriculture addressed this problem in the Grass Roots Report on Agriculture. Publication of this report resulted in the passage by the Legislature of several pieces of legislation to develop and implement farmland retention programs. The voters of the state have also approved a $50 million bond act to encourage the improvement of active farmland and its permanent protection through the voluntary sale of development easements. The County, through the Ocean County Agriculture Development Board, has actively participated in these programs.

The prime productive qualities of this non-renewable resource were the principal reason for its Conservation rating. It is recommended that agriculture be encouraged to continue and that development in this site type be restricted to activities which can occur in harmony with agricultural uses. The most highly desirable use is, of course,

active agriculture. Uses for inactive prime soils could include passive recreation, wildlife management or open space. In this manner, the agricultural value of the site type, which would be lost if it were fully developed, would be preserved.

Another consideration supporting careful use of these soils involves aquifer recharge. The New Egypt area is also located within the outcrop of the Kirkwood aquifer. The continued recharge of this aquifer, which is heavily utilized throughout the County's coastal area as a potable water source, is a significant consideration for water supply. Maintenance of the area as non-urbanized land would continue to encourage infiltration of precipitation to the Kirkwood formation.

Utilization

The third classification of site types is **Utilization.** This classification was applied to site types with a high capability to absorb development impacts. In these areas various types of land use are possible without a loss of environmental quality. Utilization site types include **Upland Forest, Upland Non-forest** and **Extractive.**

The extensive, dry **Upland Forests** of the County presented several assets to potential development. These assets included soils which are suitable for septic systems, foundations and roads and good runoff recharge capabilities. Erosion potential is generally low to moderate. The principal development constraints are a moderate forest fire hazard and moderate to severe limitations on lawns and landscaping. A dust problem may also be associated with the driest soil types during construction operations and with land uses that entail exposed earth such as playgrounds, campsites and trails.

A wide variety of development types and densities ranging from residential to industrial are possible for land areas designated Upland Forest. While these large tracts of pine or oak-dominated forest generally are conceived of as being sensitive Pinelands vegetation, an examination of their actual physical features reveals that they are actually less sensitive to disturbance and harbor fewer unique plants and animal species than the Lowland Forest, 100 Year Flood Prone Area or Dwarf Forest site types.

The small areas of **Upland Non-forest** which occur in Ocean County possess favorable soil characteristics similar to those of the Upland Forest. Vegetation in these areas consist either of cropland or old field succession, which would require less clearing and consequently lower development costs. Like the Upland Forest, this site type is suitable for a variety of land uses and development densities.

The soils which occur in **Extractive** areas are dry upland soils which are associated with slight development constraints applicable to other upland site types. Due to its

cleared nature, this site type is not significantly utilized for wildlife or vegetation habitat. When mining of sand, gravel, or ilmenite is completed these areas could provide opportunities for several types of land use and development densities. For example, where artificial ponds have been formed in extractive areas, they can be utilized for stormwater retention, groundwater recharge and possibly recreation, if appropriately designed. Several County municipalities and the Pinelands Commission have also enacted requirements providing for reclamation of mining areas. Adherence to such requirements would solve many problems involved in utilizing extractive areas for development and could reduce the future site preparation costs.

To maintain environmental quality, land uses which generate the most intensive environmental impacts should be matched with site types which are most tolerant to those impacts. Management techniques designed to mitigate specific impacts must also be identified and implemented. Table 3-7 on the following page presents a detailed, tabulor summary of the typical environmental impacts and requirements associated with various land uses. The table ranks land uses from the least intensive to the most intensive in terms of environmental impact and physical requirements. The information provides a basis for rational judgements regarding the compatibility of various land use and site types. By encouraging suitable development in the Utilization site types, resources that are more sensitive can be protected and conserved.

Condominiums in both coastal and mainland municipalities are a relatively new development type in Ocean County.

DEVELOPMENT OPPORTUNITIES AND CONSTRAINTS

Many factors influence the rate, magnitude and location of development. The environmental features of the County and their ability to accommodate increased land use activity were addressed in the previous section. There are other factors however, which also exert a strong influence both on the rate and location of growth and development in Ocean County. These factors include growth trends, area development patterns, local zoning policies, water supply, wastewater treatment facilities and

Table 3-7
Typical Environmental Impacts

Land Use		Dwelling Units Per Acre	Minimum Area (Square Feet)	Land Use Intensity Uli.	Persons Per Dwelling Unit	Persons Per Acre	Solid Waste Generated Tons/Acre/Year	Sewage Generated Gallons/Acre/Day	Water Used Gallons/Acre/Day	Water Used For Lawns Gal/Acre/Day	Percent of Impermeable Surface	Percent of Area Cleared	Additional Runoff From Impermeable Surface	Total Runoff Generated (Gal/Acre)	Stream Flows/Year Exceeding Channel Cap. After Urban. Stream Flows/Year Exceeding Channel Cap. Prior to Urban.	Estimated Peak Runoff Cu. Ft/Sec.	Change In Peak Discharge Peak Discharge After Urban. Peak Discharge Before Urban. 0	20	40	60	80	100	Percent of Area Served By Storm Sewer
Protection		—	—	—	—	—	0	0	0	0	0	0	0	19,000 CM-50	1.0	40	—	—	—	—	—	—	
Agriculture		—	—	—	—	—	—	—	IRRIGATION VARIES 540	—	—	FIELD	—	VARIES CM-35-36 1,700/75,000	—	VARIES W/COVER 35-355	—	—	—	—	—	—	
Recreation	Passive	—	—	—	—	—	—	—	—	—	10	MINIMUM 15	13,800	19,000 CM-50	1.4	90	1.05	1.3	1.7	2.0	2.1	2.2	
	Active	—	—	—	—	—	—	—	—	530	30	50%	41,000	80,000 CM-72	2.2 30% OF AREA	160	1.5	1.8	2.2	2.5	2.7	2.8	
	Active Structured	—	—	—	—	—	—	—	—	530	100	100	136,000	130,000 CM-98	5.8 100% OF AREA SEWERED	600	2.8	3.6	4.8		6.2	6.5	
Residential	Rural Suburban	1	43,560	3	4	4	3.9	320	400	500	15	36	20,400	52,000 CM-69	1.6- 15% OF AREA SEWERED	120	1.1	1.4	1.8	2.1	2.2	2.3	
	Suburban	2-3½	20,000-12,000	3	4	8-14	7.8-13.5	640-1,120	800-1,400	1,500	30	50	41,000	80,000 CM-72	2.2 30% OF AREA SEWERED	160	1.3	1.8	2.2	2.5	2.7	2.8	
	Suburban	3½-4½	12,000-9,000	3.2	3.5	14-16	13.5-15.4	1,120-1,280	1,400	1,500	40	60	51,000	68,000 CM-75	2.2 30% OF AREA SEWERED	200	1.5	2.1	2.5	2.7	3	3.2	
	Urban	4½-8	9,000-5,000	3.2-4.0	3.0	16-24	15.4-23.2	1,280-1,920	1,600-2,400	1,000	70	85	95,000	92,000 CM-85	2.8 40% OF AREA SEWERED	350	1.8	2.7	3.2	4	4.5	4.8	
	Urban	8	5,000	4.0	2.5	24	23.2	1,920	2,400	400	80	100	109,000	106,000 CM-90	4.3 50% OF AREA SEWERED	450	2	2.8	3.7	4.6	5.1	5.4	
Commercial		—	5,000-15,000	—	—	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	100	100	136,000	130,000 CM-98	5.8 100% OF AREA SEWERED	600	2.8	3.6	4.8	5.5	6.2	6.5	
Institutional			—	—	—	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	90	100	122,000	130,000 CM-98	5.8 100% OF AREA SEWERED	600	2.5	3.1	4.3	5.1	5.7	6.1	
Industrial	Research & Development	—	—	—	—	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	85	100	115,000	112,000 CM-92	5.8 100% OF AREA SEWERED	520	1.3	3.0	4.0	4.8	5.4	5.8	
		—	—	—	—	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	VARIES BY TYPE	90	100	122,000	130,000 CM-98	5.8 100% OF AREA SEWERED	600	2.5	3.1	4.3	5.1	5.7	6.2	

Source: Collins Outlot Partnership. Dover Township Environmental Base Study. 1974.

Table 3-7
Typical Environmental Impacts (Cont.)

Land Use		Approximate Sediment Yield-Tons/Acre/Year During Construction	Approximate Sediment Yield-Tons/Acre/Year After Construction	Estimated Length of Utility Lines Per Dwelling Unit (Linear Ft.)	Estimated Length of Utility Lines Per Acre (Linear Ft.)	Plants - Clearing And Disturbance	Agricultural Capability Class I, II, III	Runoff Recharge-High Infiltration Capacity Soils	Seasonal High Water Table	Soil Bearing Capacity	Groundwater Quality Quantity	Surface Water Quality Quantity	Non-Flood Condition	Slope Requirement	Access - Major Transportation - Road - Rail	Utility Requirements	Visual - High Quality Screening - Privacy	Noise Generation
Protection		0.08	-	0	0	NATURAL COVER	CLASS I, II III	-	-	-	-	-	-	-	-	-	-	-
Agriculture		VARIES WITH COVER	-	-	-	OPEN AREA	CLASS I, II III	-	MOD.	LOW CAP. REQ.	IRRIGATION	-	NOT REQ.	0-8%	ROAD	FEW	-	-
Recreation	Passive	0.8	0.3	-	-	NATURAL AREA	-	-	MOD.	LOW CAP REQ.	-	VISUAL & USE	NOT REQ.	VARIES	-	FEW	-	-
	Active	5	1.7	-	-	OPEN AREA EXT. CLEARING	-	-	MOD.	LOW CAP REQ.	IRRIGATION	VISUAL & USE	NOT REQ.	0-2%	MINOR ROAD	FEW	-	-
	Active Structured	50	4	-	-	OPEN AREA EXT. CLEARING	-	RECHARGE REQ.	DRY SOIL REQ.	HIGH CAP. REQ.	IRRIGATION DRINKING	-	REQ.	0-2%	MAJOR ROAD	MANY	SCREENING REQ.	YES
Residential	Rural Suburban	1.0	0.5	200	300	MIM. CLEARING REQ.	-	-	DRY SOIL REQ.	MOD. CAP. REQ.	IRRIGATION DRINKING	VISUAL	REQ.	0-10%	MINOR ROAD	MOD.	ADD PLANT	-
	Suburban	5	1.7	150	200	CLEARING REQ.	-	REQ.	DRY SOIL REQ.	MOD. CAP. REQ.	IRRIGATION DRINKING	VISUAL	REQ.	0-10%	MINOR ROAD	MOD.	ADD PLANT.	-
	Suburban	8	2	100	150	CLEARING REQ.	-	REQ.	DRY SOIL REQ.	MOD. CAP. REQ.	IRRIGATION DRINKING	VISUAL	REQ.	0-10%	ROAD	MOD.	ADD PLANT.	-
	Urban	15	2.5	45	140	CLEARING REQ.	-	REQ.	DRY SOIL REQ.	HIGH CAP. REQ.	IRRIGATION DRINKING	VISUAL	REQ.	0-15%	ROAD	MANY	ADD PLANT PRIVACY	-
	Urban	25	3	20	-	CLEARING REQ.	-	REQ.	DRY SOIL REQ.	HIGH CAP. REQ.	IRRIGATION DRINKING	VISUAL	REQ.	0-15%	ROAD	MANY	ADD PLANT PRIVACY	-
Commercial		50	4	-	-	CLEARING REQ.	-	RECHARGE REQ.	DRY SOIL REQ.	HIGH CAP. REQ.	DRINKING	-	REQ.	0-5%	ROAD	MANY	SCREENING REQ.	YES
Institutional		45	3.5	-	-	CLEARING REQ.	-	REQ.	DRY SOIL REQ.	HIGH CAP. REQ.	DRINKING IRRIGATION	VISUAL	REQ.	0-5%	ROAD	MANY	SCREENING REQ.	-
Industrial	Research & Development	35	3.1	-	-	CLEARING REQ.	-	REQ.	DRY SOIL REQ.	HIGH CAP. REQ.	MANUF. DRINKING IRRIGATION	-	REQ.	0-5%	ROAD-RAIL	EXTENSIVE	SCREENING REQ.	YES
	Light Industry	45	3.5	-	-	CLEARING REQ.	-	REQ.	DRY SOIL REQ.	HIGH CAP. REQ.	MANUF. DRINKING	-	REQ.	0-5%	ROAD-RAIL	EXTENSIVE	SCREENING REQ.	YES

transportation facilities. Each of these factors contribute to the determination of appropriate regional land use patterns.

The growth or decline of a geographical area results from a series of decisions on whether or not to locate development in that area. There are many different locational considerations involved in the decision-making process for any individual land use. At the same time, the considerations for a variety of uses are to a degree interrelated. As an example, the attractiveness of an area as a living environment may generate residential activity. Increases in the residential population generally attract increased commercial and service operations to serve the new or expanded market, and industrial concerns may also locate in that area to make use of the resulting labor pool.

Several locational factors were determined to be of significant importance in determining the suitability for development of an area in Ocean County. These factors were mapped to delineate growth and non-growth areas within Ocean County. The major suitability factors examined included accessibility to major highway systems, existing developed areas, accessibility to wastewater treatment facilities, the amount of land area required to accommodate projected growth and travel distance to major commercial and shopping facilities.

Five growth area classifications were identified: maximum, high, moderate, low and restricted growth based on development potential. As with environmental considerations, these locational factors have been ranked to provide an objective measure of development opportunities and constraints. A map showing growth areas in Ocean County appears on the following page. The five development classifications and associated parameters are identified in Table 3-8.

These factors collectively define the development potential of an area. It should be noted that the development potential of an area can be significantly affected by public policy decisions which results in a modification of its classification. The Preservation Area, which has been withdrawn from consideration for development by passage of the NJ Pinelands Protection Act is probably the best example of this in Ocean County. While areas within the Preservation Area contain locational factors suitable for high development potential and are free from environmental constraints there are specific regulatory restrictions which preclude their designation as growth areas. Other examples include the New Jersey Wetlands Act, the safety and noise corridor restrictions associated with airfield operations at the Lakehurst Naval Air Engineering Center and Robert J. Miller Airpark and the land use recommendations of the Pinelands Comprehensive Management Plan. The growth area map addresses these public policy decisions and subsequently has been modified where necessary.

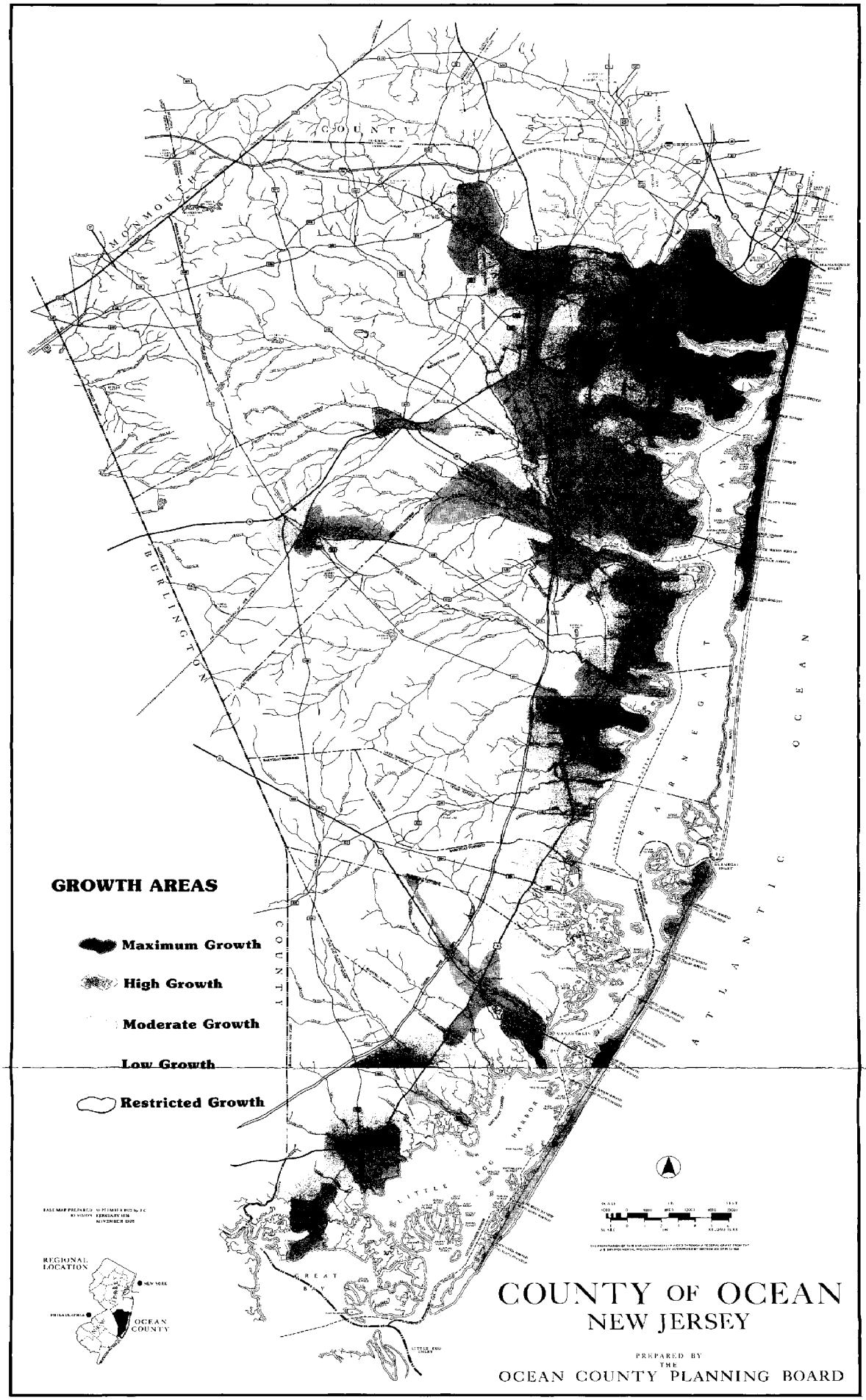

GROWTH AREAS
Maximum Growth
High Growth
Moderate Growth
Low Growth
Restricted Growth
REGIONAL LOCATION
NEW YORK
PHILADELPHIA
OCEAN COUNTY
COUNTY OF OCEAN
NEW JERSEY
PREPARED BY
THE
OCEAN COUNTY PLANNING BOARD

Table 3-8
Ocean County Growth Area Classifications

Growth Classification and Associated Criteria
Maximum Growth Potential
• Infill of vacant lands within existing developed areas; or • Redevelopment of existing developed areas consistent with land use and density guidelines; and • Serviced by an existing wastewater treatment system with sufficient capacity to provide treatment for increased wastewater flows.
High Growth Potential
• Within 2.5 miles of an exit and/or entrance to a limited access highway; or • Within 0.5 miles of an arterial, collector roadway as classified in the Ocean County Functional Classification of Roads; and • Within 0.5 miles of an existing wastewater treatment system with sufficient capacity to provide treatment for increased wastewater flows.
Moderate Growth Potential
• Within 0.5 miles of an arterial or collector roadway as classified in the Ocean County Functional Classification of Roads; and • Within the projected development land area of the Ocean County Areawide Water Quality Management Plan; and • Within a 15 minute travel time of a major commercial and shopping area.
Low Growth Potential
• Serviced by a collector roadway as classified in the Ocean County Functional Classification of Roads; and • Soil characteristics suitable for sanitary septic systems.
Restricted Growth Potential
• Within the Preservation Area as defined by the New Jersey Pinelands Protection Act as amended.

Source: Ocean County Planning Board, 1982.

It should also be noted that a growth area classification could be modified based upon changing conditions. For example, several new interchanges have been proposed along the Garden State Parkway that would result in improved access for several areas designated moderate growth. If the criteria for a high growth designation were then met, the classification would change. Another example might be construction of a sewer line through an area designated moderate growth to resolve an existing water quality

problem. If wastewater treatment could then be provided to all or a portion of the moderate growth area, its designation would also change. Conversely, a future public policy decision might reduce the growth potential of an area designated as high growth. For example, state legislation further restricting development on active agricultural lands would significantly limit future growth in some areas.

THE LAND USE PLAN

This section presents the County Planning Board's recommendations for the future development of Ocean County. The General Development Plan map which accompanies this report designates areas appropriate for future growth and recommends acceptable land use types and intensities of development for these areas. The land use recommendations are based upon a careful and comprehensive evaluation of existing conditions in the County, the ability of the environment to support additional development, future land use requirements and locational factors that must be present if new development is to occur.

The process used to prepare these land use recommendations is based upon the successive application of a series of environmental features and physical characteristics. The site typing procedure, as described previously, comprised over 20 maps depicting environmental features and an evaluation of the sensitivity of each feature to development. Also described previously was the process used to determine regional growth areas for Ocean County.

The next step was to allocate the projected land use acreages to areas of Ocean County considered to be developable and to recommend specific land uses and land use densities for these locations. This was accomplished by overlaying the Site Types map and the Regional Growth Area map to determine areas that were not only capable of accommodating additional development from an environmental perspective but also within growth areas capable of providing regional services. As an example, vacant land that had received a utilization ranking and was located within a maximum or high growth area was considered to be prime developable land where future development should be directed.

The final step in the allocation process was to make specific recommendations for land use types and densities. This analysis weighed both the potential suitability of different land uses on specific site types and the locational considerations which are important determinants in regard to the location of various land uses. Specific land uses were then allocated to developable areas. This task was accomplished on a municipal

basis and considered the environmental and growth ranking factors such as water supply facilities, wastewater treatment facilities and transportation which in conjunction with a knowledge of existing settlement patterns, development trends, subdivision activity, municipal land use and zoning regulations formed the basis for the land use recommendations. It is important to note that the allocation process determined that all projected future land use requirements could be accommodated within the areas recommended for additional development without impacting or infringing upon environmentally sensitive areas.

The General Development Plan provides for a variety of land uses that are consistent with the stated goals of this Master Plan. To accommodate the projected population increases and meet the Plan's housing objectives, a range of residential densities are provided. **Suburban Density** of 5 units per acre or more allows for a variety of housing types, including apartments, townhouses and condominiums. Frequently, this residential density reflects the existing settlement pattern and generally conforms to municipal zoning requirements. Residential development at this density will generally require public wastewater treatment. This designation is concentrated in the Maximum and High Growth regions in areas classified as Utilization.

Medium Density recommends a settlement pattern ranging from 2 to 4 units per acre. Development at this density may include single family units as well as higher density housing such as townhouses and condominiums. The medium density areas provide for a diversity of housing opportunities and densities in which a municipality could vary the density requirements within the overall area. Clustering to achieve the recommended densities while preserving open space represents an important planning application for the medium density designation. Residential development at medium density would generally require sewer facilities and is also concentrated within the Maximum and High Growth areas.

Low Density residential is intended for housing constructed on lots of one acre or more in land area. This type is primarily located in areas where surrounding development is at relatively low densities or where sewers are not immediately available or planned. Low density development consists primarily of single family homes and provides a transition zone between higher density residential uses.

Two types of commercial uses are presented, **Business and Commercial** and **Marine and Commercial Recreation.** Business and commercial areas are intended to define areas that function as regional shopping centers. Additional business and commercial areas will also be required to provide shopping facilities at the neighborhood and community level. These areas however should be refined in local master plans and ordinances. Marine

and commercial recreation areas are intended to provide recognition of the importance of these land use types to the economy of the County.

Industrial and Utilities are generally located either where existing industrial concentrations exist or where industrial parks are planned. Land zoned for industrial use with required utilities to service industrial facilities was also included to meet the land use projections. **Extractive Areas** identify mining operations that presently exist. This designation was included to recognize the value of this type of industrial use in Ocean County.

Public and Quasi-Public uses represent the location of major public facilities such as the Robert J. Miller Airpark, Ocean County College and the County's six hospitals. The largest site contained in this designation is the Lakehurst Naval Air Engineering Center. Specific recommendations for needed public facilities appear in the following section of this chapter.

Preservation areas include those lands containing environmentally sensitive areas that should be preserved in their natural state. Included in the preservation designation are wetlands, lowland forest types, stream corridors, flood prone areas and headwaters of streams. The largest area covered by this designation is the Preservation Area established by the Pinelands Protection Act, including all of the Cedar Creek basin west of the Garden State Parkway.

Conservation areas refer to those lands that do not contain environmentally sensitive features, but are not immediately required to meet future land use projections or do not possess high development potential at this time. They are intended to act as a reserve for future land use requirements beyond the planning period covered by the Master Plan. They also act as a buffer or transition area between dissimilar intensities of development or environmentally sensitive areas. It should be noted that in the Pinelands Area of Ocean County, the Conservation areas generally conform to the Forest Area designation of the Pinelands Comprehensive Management Plan. These areas should only be considered as suitable for the uses permitted in Forest Areas, and not as a reserve for future land use requirements.

Recreation and Open Space delineates the major tracts of publicly owned parks, forests and fish and wildlife management areas. This land use is concentrated primarily west of the Garden State Parkway and includes large portions of the Preservation Area of the Pinelands.

Agricultural uses include those lands either actively farmed or containing prime open agricultural soils. This use is concentrated in Plumsted Township and portions of Jackson and Lakewood Townships.

REGIONAL PERSPECTIVE

The General Development Plan provides sufficient land area to accommodate the projected population and land use requirements of the Master Plan through the year 2000. It locates these uses in suitable areas that are capable of supporting additional development without impacting the environmental resources of the County. It is a long range plan that provides a regional perspective on growth related issues facing Ocean County.

Future development should be directed to areas where regional facilities required to service that growth either already exist or can be efficiently provided. The County recommends that major new development locate within the Maximum and High Growth areas, and that capital improvements required to meet future needs be programed for these areas. Expansion of regional facilities outside these growth areas will not be necessary unless required to resolve an existing problem. If new development does occur in areas not recommended for regional facilities it will be the responsibility of the developer to finance and construct the necessary infrastructure consistent with all appropriate regulations and permits. Facilities outside the Maximum and High Growth areas required to solve an existing problem may be provided by public agencies.

The land use recommendations reflect this policy by delineating sufficient land areas within the Maximum and High Growth areas to accommodate future needs. The delineations also reflect a recognition that these areas are the most appropriate locations for future growth because they have a variety of existing facilities and services that will be required by future residents. These may include not only public and quasi-public facilities such as wastewater treatment systems, water systems, hospitals and schools, but also private facilities such as regional shopping centers and employment centers. In many instances, the design of these facilities has provided for increased usage by future residents.

If future growth does not proceed in accordance with the Master Plan, the result will be a scattered and inefficient development pattern for Ocean County. Past investments to construct, improve or expand facilities will likely be duplicated to provide required services and existing facilities will be underutilized. The ability of all levels of government to finance and construct new facilities has decreased in the face of revised federal budgetary policies. It is also increasingly difficult to fund the operation and maintenance of existing services. The Master Plan's recommendations and policies seek to provide a concentrated, efficient development plan that will build on past investments, maximize the use of facilities already constructed, program the planned expansion of necessary services and avert costly and wasteful duplication.

The County Master Plan provides a useful guide to municipalities and other planning agencies involved in developing and implementing planning programs and policies. As with any regional plan, it should be recognized that the land use and density recommendations are generalized. It is intended that municipalities consider the Master Plan in establishing the general development pattern for their communities. They can then refine the recommendations to meet local needs and concerns through their own planning efforts.

Finally, it must be recognized that because this is a regional plan, both the land use and environmental delineations are purposely broad. While a specific site may be within an area recommended for development, the site may display environmental or other constraints that would make that site unsuitable for more intense use. Conversely, specific sites may be located within an area recommended for preservation that do not exhibit the physical limitations of the general land area and could therefore be developed in accordance with applicable land development controls.

PINELANDS AREA RECOMMENDATIONS

The New Jersey Pinelands Commission was established in 1979 with the enactment of the NJ Pinelands Protection Act and Section 502 of the National Parks and Recreation Act of 1978. Both the state and federal acts required the preparation of a comprehensive management plan to govern the development of the New Jersey Pinelands. The federal Act established the Pinelands National Reserve which consists of approximately 1.1 million acres in southern New Jersey. The state Act established the Pinelands Area, approximately 934,000 acres in size, within the Pinelands National Reserve. The state Act also gave the Pinelands Commission direct regulatory authority over most development activity occurring within the two components of the Pinelands Area: the Preservation Area and the Protection Area.

On November 21, 1980 the Pinelands Commission adopted the Pinelands Comprehensive Management Plan (CMP) which contained substantive land use and environmental resource policies for the Pinelands. The NJ Pinelands Protection Act required Ocean County and the 13 County municipalities with land area within the Pinelands Area to amend their master plans and land development ordinances to conform to the minimum standards of the Pinelands Comprehensive Management Plan. In Ocean County, the Pinelands Comprehensive Management Plan directly affects future land uses for over 183,000 acres in the Pinelands Area and sets forth recommendations for an additional 80,500 acres within the Pinelands National Reserve.

In 1983, the Planning Board submitted the Ocean County Comprehensive Master Plan to the Pinelands Commission for certification. In April of that year, the County received conditional certification of its Master Plan and land development ordinances from the Pinelands Commission. A revised Comprehensive Master Plan was adopted by the Planning Board and submitted to the Pinelands Commission in August 1983. The revisions primarily addressed proposed changes in the land capability districts in western Berkeley Township.

The Planning Board proposed the redesignation of areas designated as Forest Area and Rural Development to medium density residential. The intent of the proposed redesignation was to provide for the completion of necessary road and sewer facilities, continued development of the Robert J. Miller Airpark and associated economic development opportunities and the achievement of long-range growth management policies. Despite extensive discussions, the Pinelands Commission acted not to certify the County's submission in October, 1983.

Forestry is a traditional Pinelands industry, as illustrated by this early picture of lumbering at Double Trouble.

Since 1983, the Planning Board has continued to participate actively in conformance discussions with the Pinelands Commission. In addition, 10 of the County's Pinelands municipalities have received full certification of their master plans and land development ordinances from the Pinelands Commission. Dover Township and Tuckerton Borough, located entirely within the Pinelands National Reserve are not required to receive certification. South Toms River Borough and Lacey Township have reached a general agreement with the Pinelands Commission on land use issues in those municipalities. Berkeley Township received full certification from the Pinelands Commission in 1985. That certification action was successfully challenged in the New Jersey Appellate Court in 1986 and subsequently the Township must again seek full certification from the Pinelands Commission.

The Planning Board's interest and involvement in seeking redesignation of certain land capability districts in western Berkeley Township primarily resulted from a need

to achieve regional planning objectives. The County was concerned that a regional sewer interceptor needed to service portions of Berkeley Township and, most importantly, the Whiting area of Manchester Township would continue to be delayed until agreement on the future development of this portion of the County was achieved with the various state and municipal governments involved. In addition, the County was deeply concerned that agreement be achieved for the completion of the road system required to provide normal and emergency access to existing developments in Berkeley Township. Specifically the completion of Mule Road through the Pinelands Area of western Berkeley Township, and the associated connections with local collector roadways were seen as critical to the completion of a rational circulation system for the Township.

Table 3-9
Approximate Acreages of Land Capability Districts in Pinelands Area Municipalities

Municipality	Preservation District	Forest Area	Agriculture Production	Rural Development	Regional Growth	Pinelands Town	Pinelands Village	Military Federal
Barnegat	5,809	5,234	0	0	2,854	0	75	0
Beachwood	0	0	0	0	450	0	0	0
Berkeley[1]	4,559	20,624	690	0	943	0	0	0
Eagleswood	1,126	1,290	0	0	0	0	0	0
Jackson	9,240	4,820	0	3,780	3,540	0	2,474	6,330
Lacey[2]	30,893	10,177	0	914	0	0	0	0
Lakehurst	0	0	0	0	0	515	0	25
L. Egg Harbor	10,182	1,510	0	0	0	0	90	0
Manchester	17,286	9,617	0	0	2,010	0	4,500	5,114
Ocean	38	4,985	0	3,200	0	0	278	0
Plumsted	124	717	0	593	0	0	0	11,940
S. Toms River[3]	0	0	0	0	360	0	0	0
Stafford	700	9,430	0	140	2,800	0	210	0
Ocean County	79,957	68,413	690	8,627	12,957	515	7,627	23,409

Notes: [1]Certification pending.
[2]Pinelands CMP designation.
[3]Conditionally certified.

Source: NJ Pinelands Commission, 1983.
Ocean County Planning Board, 1986.

Moreover, the continued development of western Berkeley Township was seen as a means to achieve long-standing growth management policies reflected in both the County's and the Township's Master Plans. The County has consistently sought to utilize its investment in capital improvements to direct future growth to suitable areas. Western Berkeley Township, due to its proximity to existing residential and commercial development and proposed sewer and road projects was viewed as a logical extension area for future development which would contribute to a rational and efficient development pattern for Ocean County. This policy was also reflected in large measure in the NJ Department

of Environmental Protection's Coastal Zone Management Plan, which designated that portion of western Berkeley Township within their jurisdiction as an Extension Region.

The need for continued development in this area was accentuated by a concern that the projected level of new development envisioned in other Regional Growth Areas within the County would not be achieved. This issue resulted from a determination that wastewater treatment facilities required to accomodate the intensity and extent of development designated in the Pineland's Regional Growth Areas of Stafford, Barnegat, Manchester and Jackson Townships would not be practical without some form of governmental financial assistance. In the absence of these facilities, the County would be unable to provide for the housing and future land use requirements projected in its Master Plan.

Following extensive discussions between the County, Township and the Pinelands Commission it was agreed that an expansion of development areas within western Berkeley Township would be permitted to accomodate approximately 3,425 new dwelling units. Berkeley Township adopted a revision to its Master Plan to accomplish this objective and other environmental and land use policies and the Pinelands Commission certified Berkeley Township in 1985. Unfortunately, the Pinelands Commission's certification action was successfully challenged by a New York based environmental organization in 1986, and the Pinelands Commission decided in 1987 not to seek an appeal of the Appellate Court's ruling. The effect of that action was to call into question the Pinelands Commission's designation of approximately 282 acres in Berkeley Township formally certified as Rural Development/Municipal Reserve.

From the County's perspective, many of the regional issues that existed in 1982-1983 have been resolved. In 1984, the Pinelands Commission, the NJ Division of Water Resources and the NJ Division of Coastal Resources approved a modification to the design and alignment of the Davenport Regional Interceptor. The resulting line, the Crestwood Interceptor, has been constructed and is now in operation. Construction of this line permits the abandonment of the Crestwood Sewer Company's Wastewater Treatment Plant in Manchester Township, the continued operation of which violated state water quality standards and was inconsistent with the Ocean County Areawide Water Quality Management Plan.

Furthermore, in 1985 the voters of the state approved the Pinelands Infrastructure Bond Act. This Act provides a trust of $30 million to assist in the construction of infrastructure required to accommodate new development in Pinelands Regional Growth Areas. The Pinelands Commission adopted a Pinelands Infrastructure Master Plan and Financing Element in January 1987 that will provide funding for two major projects in

Ocean County. The plan proposes that the Ocean County Utilities Authority receive $3.68 million in grants and loans to construct the Ridgeway - Cabin Branch Regional Interceptor. This facility will permit the provision of wastewater collection systems in the Regional Growth Areas of Manchester and Jackson Townships. The Stafford Municipal Utilities Authority is recommended for $2.8 million to construct a collection system in the Ocean Acres portion of that township. These two projects, when completed in 1988, will significantly improve the viability of these areas to achieve the level of development envisioned in the Ocean County Comprehensive Master Plan.

The Robert J. Miller Airpark is a major County facility located in Berkeley and Lacey Townships. The Pinelands Comprehensive Management Plan designates the facility as both Preservation and Forest Areas. A major issue with the Pinelands Commission has been to insure that the Airpark can continue to develop in accordance with the County prepared and Federal Aviation Administration approved Robert J. Miller Airpark Master Plan.

Most of the active airport operation areas are located in the Forest Area of Berkeley Township. Article 5 of the Pinelands Comprehensive Management Plan permits airport facilities and compatible light industrial uses provided that the airport is publicly-owned. Proposed amendments to the Pinelands CMP would specify the amount of land area permitted for compatible light industrial uses. If adopted, light industrial uses would essentially be limited to those areas of the Robert J. Miller Airpark designated for industrial use in its master plan and the adjacent Berkeley Industrial Park.

In the Preservation Area, accessory uses to Preservation Area facilities are a permitted use. In addition, the Pinelands CMP permits an expansion of 50 percent of those lawful uses in existence prior to the 1980 adoption of the plan, subject to the management programs and minimum standards contained in Article 6.

The County therefore has a right under the Pinelands Comprehensive Management Plan to continue the development and improvement of its airport facility and compatible light industrial uses associated with the publicly-owned airport. The transportation section of the Master Plan sets forth the specific projects planned for the Robert J. Miller Airpark. In the past, however, the major obstacle to receiving the required approvals for public development at the R. J. Miller Airpark has been the absence of sewers. This has presented a similar restriction to the efficient development of the Berkeley Industrial Park.

The Planning Board recognizes the need for a trunk sewer line designated specifically to service the Robert J. Miller Airpark and Berkeley Industrial Park to connect to the Crestwood Interceptor. The precise alignment for the required trunk line can only be determined based on detailed field investigations and engineering considerations. Two

alternatives are apparent and should be considered in the completion of the required application for public development.

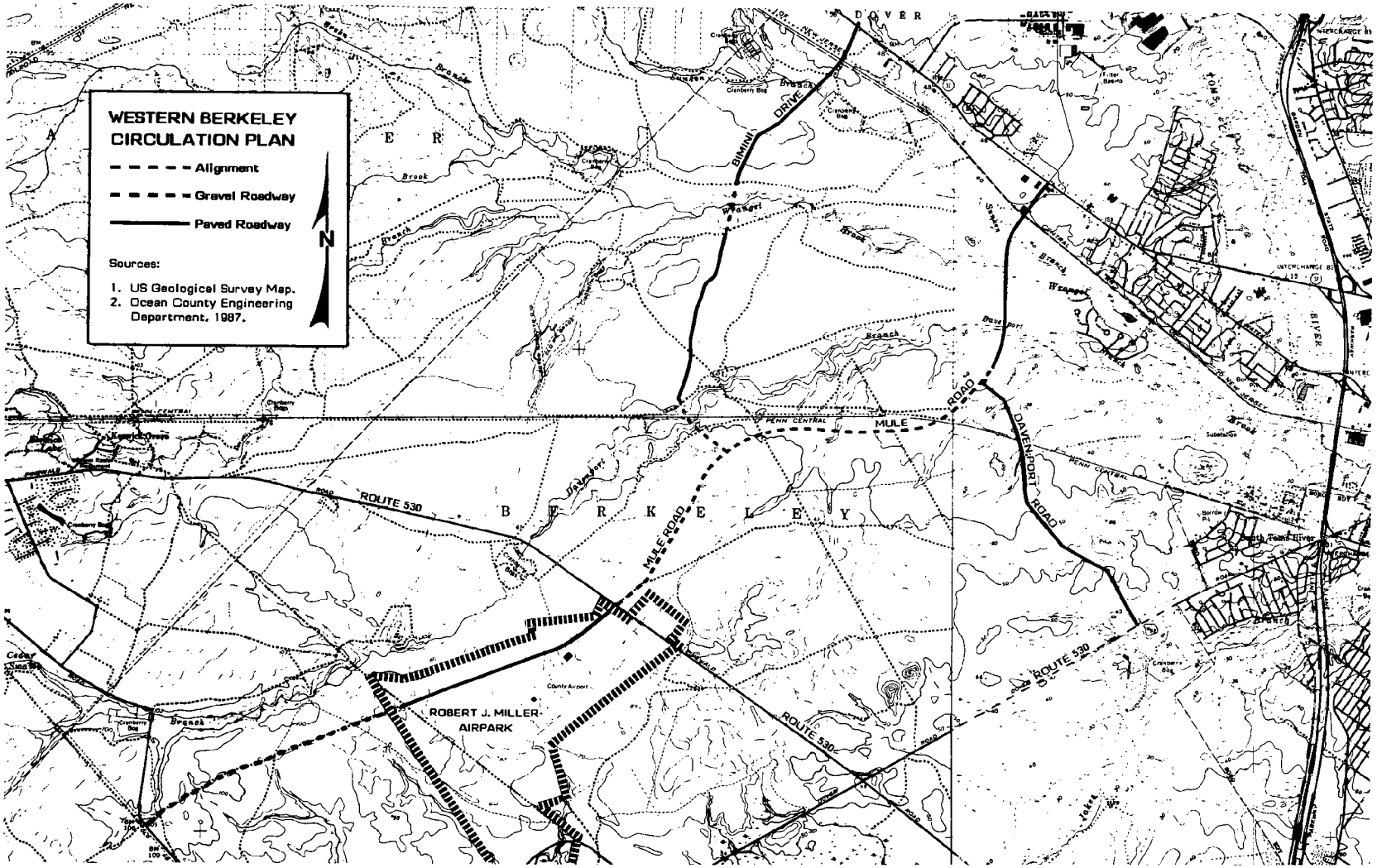
The first potential alignment should consider the use of the rights-of-way along Route 530 and Crossley Road for the installation of a force main. The second alternative would be to utilize the right-of-way for Mule Road as much as practical for a gravity line. Either alignment would minimize disruption of the Forest Area and connections would be limited to those facilities permitted under the Pinelands Comprehensive Management Plan.

The remaining regional issue, and it continues to be of major concern, is the completion of a rational and efficient road network to reduce traffic congestion and improve access in the existing developed areas of western Berkeley Township. The completion of Mule Road from its existing terminus at the Holiday Heights development to the completed portion at Route 530 adjacent to the Robert J. Miller Airpark is the key to resolving this issue. Construction of the missing segment would provide improved north-south access from County Route 530 to NJ Route 37 in Dover Township. The completion of local collectors to Mule Road would further eliminate congestion and provide improved emergency access to the western-most developments within Berkeley Township.

The generalized alignment of Mule Road and required local collectors are shown on the following map. The location of the proposed facilities is based on discussions held with representatives of the County, Berkeley Township, the Pinelands Commission and appropriate agencies within state government, particularly the NJ Division of Coastal Resources, in 1986. It is recognized that the completion of Mule Road through the Forest Area of western Berkeley Township will require the approval of the Pinelands Commission. The County has initiated studies required to address the requirements set forth in Articles 4, 5 and 6 of the Pinelands Comprehensive Management Plan. Completion of these studies will permit the County to proceed with an application for public development to the Pinelands Commission and a subsequent review of any site specific environmental and land use concerns associated with its completion.

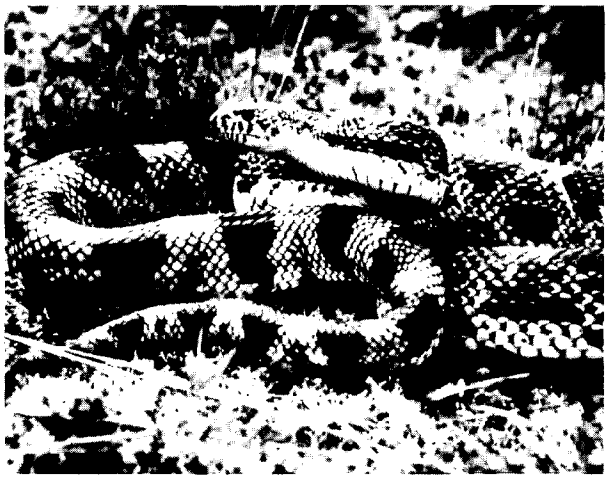
The remaining issue with regard to the Pinelands Area of Berkeley Township is the ultimate designation of the 282 acres affected by the Appellate Court's decision. In its published ruling, the Court ruled that the Pinelands Commission had violated its own requirements set forth in the Pinelands Comprehensive Management Plan for changing this area from Forest Area to Rural Development/Municipal Reserve. It also found that a change of the proposed magnitude, which would have permitted between 1153 and 1739 residential units and commercial establishments on the 282 acres constituted an amendment to the Pinelands CMP, requiring formal action. The effect of this decision, and the

Figure 3-5
Western Berkeley Circulation Plan



Pinelands Commission's determination not to appeal it, is that Berkeley Township must again discuss with the Commission the future use of this small area. The Township, under the Article 5 standards of the Pinelands CMP has a variety of options that it can pursue with the Pinelands Commission. It is premature to speculate on the outcome of the conformance process for this area, but the Planning Board would support the recommendations of Berkeley Township provided that the designation does not preclude the completion of Mule Road, as previously discussed.

The Pinelands Commission is also undertaking a major review of the Pinelands Comprehensive Management Plan as required by the NJ Pinelands Protection Act. Proposed amendments to the Pinelands CMP include a recommendation that the designated Pinelands Village of Whiting, Manchester Township be redesignated as a Pinelands Town. The Planning Board supports the proposed redesignation.



The habitat of the northern pine snake, a threatened species, is protected by the Pinelands Protection Act.

It is the belief of the Planning Board that these revisions bring the Ocean County Management Plan into conformance with the minimum standards of the Pinelands Comprehensive Master Plan. It is recognized that the land use recommendations presented in the General Development Plan map do not precisely reflect the land capability districts of the Pinelands CMP. This is because the County's recommendations must pertain to its entire land area, not just the Pinelands Area.

The recommended land uses and intensity of development are, however, generally consistent with the specific uses permitted in the Pinelands Commission's land capability districts and, like the Pinelands Comprehensive Management Plan, are intended to serve as a regional guide to municipalities in preparing their master plans and land development ordinances. Furthermore, the environmental analysis followed by the County in preparing its land use recommendations is similar to, although not identical, to the process followed by the Pinelands Commission and the environmental recommendations are generally consistent with the environmental resource policies of the Pinelands Commission. Future development that reflects the land use recommendations for the Protection and Conservation site type categories will protect these sensitive areas from inappropriate development throughout Ocean County.

WATER RESOURCES

Both ground and surface water resources in Ocean County are generally of very high quality. The County, through the Ocean County Board of Health has monitored the quality of its lakes, streams and rivers since 1977 and of its groundwater since 1985. These ambient monitoring programs confirm that overall the quality of the County's water resources remain at a high level.

The land use recommendations of the Master Plan will, if achieved, serve to protect the County's water resources by directing future growth to appropriate areas. Environmental resources closely associated with the protection or maintenance of water quality, such as coastal and freshwater wetlands, stream corridors and stream headwater areas would be protected from inappropriate development.

The Surface Water Assessment and Addendum prepared as an element of the County's Water Quality Management Plan identified stormwater runoff, from both agricultural and urban sources as the major source of continuing surface water degradation. Quality impacts from runoff will continue to be of concern, particularly since the completion of the Ocean County Utilities Authority system will eliminate most existing point source discharges in Ocean County, and new point discharges are prohibited.

Much can be done however to protect water resources from the negative effects of runoff through the implementation of stormwater management plans and the review of drainage plans associated with individual development applications. Under the Areawide WQMP, the Planning Board and the Engineering Department are designated as the management agencies responsible for the control of stormwater runoff and other nonpoint sources. To achieve their management responsibilities, the County has prepared a Technical Design Manual containing best management practices appropriate for use in Ocean County to control both the quality and quantity impacts associated with stormwater runoff. These best management practices suggest ways that an applicant can meet the quality and quantity standards adopted by the County in the Subdivision and Site Plan Resolution.

The Planning Board will continue, through the administration of its Subdivision and Site Plan Resolution to require that land development applications apply best management practices to control nonpoint sources of pollution. The use of best management practices in the design and location of drainage facilities will have a positive impact on the protection and enhancement of the County's water resources. A new concept that should be explored with the appropriate state and regional regulatory agencies is the use of best management practices offsite of a particular development as a means to achieve a net increase in water quality.

The Planning Board further recommends that the Engineering Department, in conjunction with the Areawide Agency, prepare stormwater management plans for all of the drainage basins in the County that have not yet been studied. Of particular importance is the preparation of the Phase I plan required by the state's stormwater management regulations. Completion of a Phase I plan would provide a regional perspective to municipalities in the preparation of local plans and standards.

Flooding is also a major concern because of the potential for the loss of lives and damage to public and private property. Achievement of the Master Plan's land use recommendations will protect the County's flood plains from inappropriate development. However, in some portions of the County development has already occurred in areas that are prone to flooding. Structures that are located in riverine and coastal flood hazard areas that are destroyed or substantially damaged by flooding or other means, should be relocated outside the flood hazard areas, if possible, to reduce the potential for future damage or endangerment to the public.

Providing for proper drainage is a function of both land use planning and development controls.

The Board also recommends that future land development provide for the maximum recharge of precipitation as a method of reducing the danger of flooding. Consideration should be given to using the undeveloped flood plains of the County's rivers and streams as natural retention basins. Such a program would also protect stream corridors and evironmentally sensitive areas and provide for the recharge of groundwater supplies.

WATER SUPPLY

Ocean County water users receive potable water supplies in one of three ways: from an on-site well, from a central water system operated by a private company, or through a publicly-owned and operated water system. Until 1987, the source of all potable water supplies in Ocean County was groundwater. Traditionally, the most common response to the need for increased supplies by both public and private purveyors has been to install additional wells or to seek increased diversion rights for existing wells.

The drought conditions that affected the entire state in the early 1980's resulted in a comprehensive review of the state's approach to the management and allocation of water supplies. In 1982, the New Jersey Department of Environmental Protection prepared the New Jersey Statewide Water Supply Master Plan (WSMP). This was the first statewide planning effort to examine in detail the existing and future water needs of the state, by region, and the ability of suppliers in those regions to meet those needs. The WSMP also recommended several major capital projects that would be required to provide for future water supply needs and, perhaps most importantly, a series of institutional and regulatory changes to provide for the more efficient management and allocation of water supplies. The voters of the state have subsequently approved several major bond issues to finance recommended capital projects. The enactment of the New Jersey Water Supply Management Act completely overhauled the state programs dealing with water supply. Both of these actions will have significant long-term effects on the provision of water supply in Ocean County.

Until recently, Ocean County has been completely dependent upon groundwater as a source of water supply for residents and commercial and industrial users. Fortunately, the County overall contains an abundance of high-quality groundwater resources that if properly managed are sufficient to meet the total projected future demand of 88 million gallons per day by 2000. There are, however, limitations on the continued reliance on groundwater as the primary source for potable water usage.

The first limitation involves the overuse of groundwater from specific aquifers in certain locations in Ocean County. When water withdrawals from an aquifer exceeds the ability of the system to recharge naturally, groundwater mining occurs. This means that more water is taken out of the system than can be replaced from either precipitation or linkages with other aquifer systems. The result is a decline in water levels in the aquifer, a potential consolidation of the water-bearing sediments comprising the aquifer affecting future storage and, in coastal areas such as Ocean County, the potential contamination of the aquifer through saltwater intrusion.

The WSMP recognized the need to increase supplies in Ocean County to provide for future demand. It also expressed concern for existing groundwater supplies that were determined to be experiencing problems from overdrafting and potential saltwater intrusion. The major area of concern in Ocean County was the northeastern municipalities that utilized groundwater from aquifers that were also heavily pumped by purveyors in Monmouth County.

In response to these concerns, the New Jersey Department of Environmental Protection established new regulations to manage water withdrawals from specific aquifer

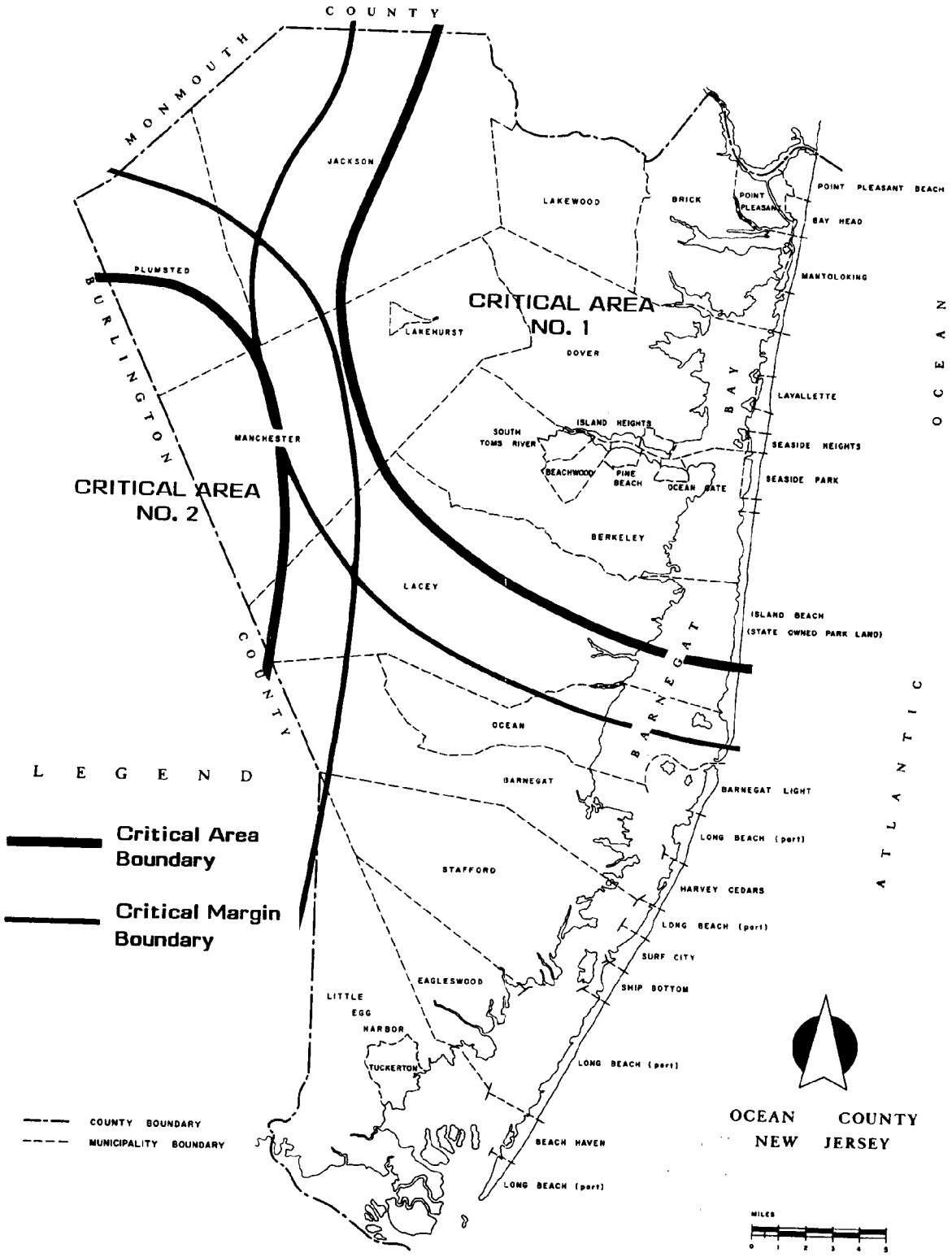
systems determined to be under stress from overdrafting. In 1985, the NJ Division of Water Resources promulgated regulations designating Water Supply Critical Area Number One, which affects water withdrawals in northern Ocean County. Under this program, the Englishtown, Mount Laurel - Wenonah and the Potomac - Raritan - Magothy systems were designated as Aquifer Critical Areas. In 1986, the state designated Water Supply Critical Area Number Two, affecting water withdrawals in western Ocean County. The Potomac - Raritan - Magothy system was designated as an Aquifer Critical Area under this program. The effect of these designations is that the specific designated aquifer systems are considered by the state to be depleted or threatened for purposes of water allocation. The amount of withdrawals permitted from these aquifers must be reduced to a level allowing the systems to recharge, eventually establishing an equalibrium between recharge and withdrawals.

Specifically, within the designated Water Supply Critical Areas including the marginal areas, any proposed new or increased withdrawal of over 10,000 gallons per day from designated systems, including groups of wells associated with a single development project which have a total capacity of more than 10,000 gallons per day, requires state approval. In addition, those purveyors with permitted allocations of 100,000 gallons per day within the designated area must reduce annual withdrawals from the designated aquifers to a base allocation established by the amount of water actually withdrawn in 1983, effective as soon as alternative water supplies are available. This equates to a 35 percent reduction in withdrawals from designated aquifers. Purveyors in critical margins must stabilize water withdrawals at the 1983 base allocation.

Purveyors affected by Water Supply Critical Area designation have several options available to meet state requirements. These include implementation of water conservation measures, including system rehabilitation, the development of alternative projects to produce more water, or to purchase additional water from approved projects, from sources other than a depleted or threatened aquifer. No Ocean County purveyors were immediately affected by the designation of Water Supply Critical Area Number Two. Purveyors in Jackson, Lakewood, Brick, Point Pleasant, Point Pleasant Beach, Bay Head, Mantoloking and Dover were impacted by the designation of Water Supply Critical Area Number One and must develop plans to bring their sources of supply into compliance with the state's requirements.

In 1985, Brick Township sought and was granted state approval to divert surplus flow, amounting to 6 million gallons per day, from the Metedeconk River. This diversion, subject to permit conditions, should provide a sufficient water supply source to meet the existing and future needs of Brick Township. It also results in the potential to provide,

Figure 3-6
Water Supply Critical Areas Within Ocean County



through interconnections, an adequate supply for Point Pleasant and Point Pleasant Beach. This permit represents the first use of surface water as a potable water supply source.

Another potential alternative for purveyors affected by critical area requirements is the Manasquan River Reservoir project to be constructed by the New Jersey Water Supply Authority. This project involves the construction of two reservoirs in Monmouth County to be supplied with excess flow from the Manasquan River. The lower reservoir is located off-channel and is designed to yield up to 10 million gallons per day. The upper reservoir, located off-stream, is designed to yield 25 million gallons per day. The estimated cost of these facilities is in excess of $40 million and initial supplies should be available from the lower reservoir in 1990.

All or portions of Brick, Dover, Jackson, Lakewood, Bay Head, Mantoloking, Point Pleasant and Point Pleasant Beach are within the service area of the Manasquan River Reservoir and are eligible for allocations from this project. At this point, no Ocean County municipality has decided to contractually seek an allocation from this facility. A portion of the project's yield remains unallocated and, if required, could be utilized as a future source of supply by one or more of these municipalities. It therefore remains an important alternative water supply source for Ocean County.

The second limitation on the availability of water supply in Ocean County is the contamination of either existing or potential groundwater supplies. The soil and geologic conditions of the County make the water table aquifer and other shallow systems very susceptible to contamination from land-based sources. In addition, overdrafting in coastal areas can result in saltwater intrusion as previously discussed.

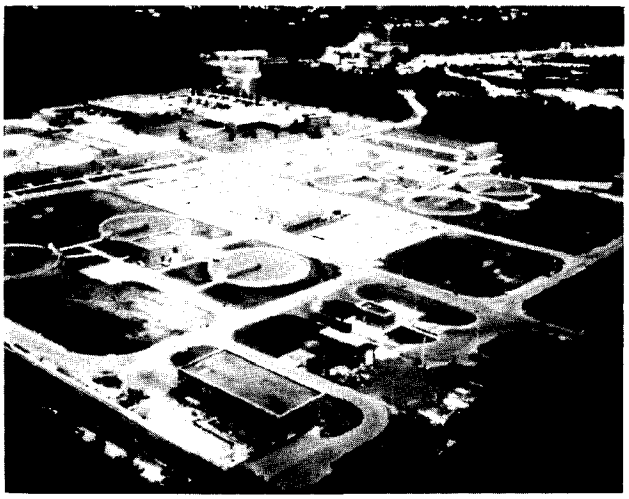
To protect both the quality and quantity of groundwater resources, aquifer recharge areas for the non-water table aquifers should be protected from inappropriate development. Recharge areas for these aquifers within Ocean County appear on the map in Chapter 2. Where possible, identified aquifer recharge areas should be publicly acquired as open space. New development occurring in recharge areas should be of low density and provide for maximum recharge of stormwater with appropriate best management practices to protect water quality.

In areas serviced by water supply systems, buffer areas should be provided to protect well fields. Water suppliers should also identify areas within the drainage basin in which they are located that would be suitable for the development of future well fields. This will avoid the overpumpage of existing wells which could result in a change in the stratigraphic head or major lowering of the water table. New development in areas relying on individual on-site wells should also provide for maximum recharge of stormwater consistent with quality considerations.

The Ocean County Planning Board offers the following general and specific recommendations to provide for the future water supply needs of Ocean County:

- **The Manasquan River Reservoir Project, for which funds were provided in the Water Supply Bond, should be constructed to provide a viable alternative for the long-term needs of the County's northeastern municipalities,** particularly Brick, Lakewood, Jackson, Point Pleasant and Point Pleasant Beach.
- **Purveyor's within Water Supply Critical Areas should develop the required alternatives** to bring them into comformance with state requirements.
- **Aquifer recharge areas of aquifers designated as Critical Area Aquifers should be protected** from inappropriate development to permit those systems to stabilize.
- **Aquifer recharge areas, especially outcrops of confined aquifer systems such as the Kirkwood, should be protected from inappropriate development.** The appropriate County, state and federal agencies should continue and expand their analysis of County groundwater resources to identify critical recharge areas. These areas should be prioritized based on their importance as a source of potable water supply and the potential for inappropriate development to threaten their function. Methods should be established to preserve these areas including land development controls and acquisition by public agencies or private water suppliers.
- **Other natural groundwater recharge areas such as the headwaters of streams, marshes and bogs should be preserved in their natural state** by encouraging the establishment of sensitive land use controls and by public acquisition in either fee simple, conservation easement or dedication.
- **Municipal and private water suppliers should consider the acquisition of sufficient buffer areas surrounding well fields to protect groundwater sources from contamination.** This would be of special value to suppliers pumping from the water table aquifer.
- **The Ocean County Board of Health should continue its comprehensive county-wide groundwater monitoring program** to establish ambient conditions of groundwater quality and quantity for those aquifers most heavily used as sources of potable water.
- **Land development ordinances at all levels of government should encourage the recharge of stormwater to groundwater** to the maximum extent possible dependent on site conditions and the quality of anticipated runoff.
- **Land development at average densities of one unit or more per acre should incorporate into their design and construction provisions for public water supply.**

- **New development, and the rehabilitation or maintenance of existing structures, should be encouraged to incorporate water conservation measures.**
- **The County Planning Board should seek to build on these recommendations and complete a comprehensive County-wide review of water supply issues** and develop recommendations on measures required to insure the availability of water supplies to meet existing and future needs of water users throughout the County.
- **To provide for the long-term needs of Ocean County, no groundwater or surface water should be exported from the County.**



The Ocean County Utilities Authority operates three modern regional treatment plants, helping to protect water quality.

WASTEWATER TREATMENT

The Master Plan designates land areas suitable for future development at density levels that will require wastewater collection facilities. New or expanded collection systems will be required to service several areas. Expansion of sewerage facilities must be consistent with the adopted Ocean County Areawide Water Quality Management Plan.

There is sufficient wastewater treatment capacity in the Ocean County Utilities Authority's northern and southern treatment plants to meet the existing and projected needs of Ocean County through the year 2000. The central treatment plant, however, will require an expansion prior to that date. Also, the OCUA's septage treatment facilities will be sufficient to meet the County's needs for the treatment of septage wastes.

Based on the site type and future needs analysis, there is sufficient developable land area in the Maximum, High and Moderate Growth areas to accommodate the projected population and land use increases through the year 2000. These areas are either served by existing collection systems or capable of being served by reasonable expansions of existing systems. Future high density development should locate in these areas. As a general policy, wastewater treatment facilities should not be extended to areas of Low Growth or to Preservation Areas. New package sewage treatment plants should be prohibited for wastewater treatment.

In the Pinelands Area, new wastewater treatment facilities and the expansion of existing facilities should be permitted to service Regional Growth Areas, Pinelands Villages

and Towns, and those portions of Rural Development Districts projected for future high density development. Sewage treatment facilities in non-growth areas should be permitted only where required to mitigate existing water quality and health problems caused by malfunctioning septic systems or to eliminate existing point source discharges.

The predominant method of domestic wastewater treatment in low density areas of the County will be on-site septic systems. New systems should not be located in areas where soil suitability is limited. The soil limitations for septic systems as presented in the generalized Septic Suitability map, should be utilized as a planning guide in determining the suitability of an area for septics. However, actual site conditions must be considered in permitting the installation of new septic systems. In addition, in the Pinelands Area of Ocean County standard septic systems may only be used where the depth to seasonal high groundwater is at least 5 feet. Adequate maintenance must also be provided by the property owner to ensure continuous and safe operation. The use of septic tank cleaners should be discouraged in Ocean County because of their potential as a source of groundwater degradation. The NJ Pinelands Commission already prohibits their use in the Pinelands Area.

The County Planning Board presents the following general and specific recommendations to provide for the provision of adequate wastewater treatment facilities:

- **The OCUA should complete the construction of the Crestwood Interceptor to service the western Berkeley Township area designated for development under this Plan,** and to provide for the transport of wastewater effluent from the Crestwood Village Sewage Treatment Plant, development in the Whiting Pinelands Village and adjacent developments within the defined service area of this interceptor.
- **The OCUA in conjunction with the Ocean County Areawide Agency, Jackson Township and potential users should proceed with the detailed engineering, design and construction of the extension of the South Branch Metedeconk Interceptor** to provide for wastewater collection facilities to service the portions of Jackson Township designated for development under this Plan and to permit the eventual elimination of several existing point source discharges.
- **The OCUA in conjunction with the Ocean County Areawide Agency, Manchester Township, Jackson Township and potential users should proceed with the detailed engineering, design and construction of the Ridgeway-Cabin Branch Interceptor required to provide for wastewater collection facilities in the Ridgeway portion of Manchester Township, the Regional Growth Areas in southeastern Jackson**

Township and to permit the eventual elimination of several existing point source discharges.

- **The OCUA in conjunction with the Ocean County Areawide Agency, Stafford Township, Barnegat Township and appropriate regulatory and funding agencies should determine the best means of providing wastewater treatment to the Ocean Acres** portion of Stafford and Barnegat designated as a Pinelands Regional Growth Area.
- **The Ocean County Areawide Agency should continue to prepare detailed sewer service area delineations for inclusion in the Ocean County Areawide Water Quality Management Plan** in conjunction with the OCUA and applicable municipal agencies.
- **The Planning Board recommends that additional studies be undertaken on the best means to provide public wastewater treatment facilities for the New Egypt** portion of Plumsted Township. Alternative and small community designs should be evaluated in view of the reduction in Section 201 Construction Grant Funds. These studies are required because of the inability of the Northern Burlington County Regional Sewerage Authority to provide treatment facilities for this area as originally envisioned.
- **The Planning Board supports the continuation of state and federal grant funds to provide financial assistance** to municipalities and municipal utility authorities for the completion of approved or required wastewater collection systems and the rehabilitation of existing systems.
- **The Planning Board recommends that the County Board of Health and the OCUA continue the septage manifest system for all septage pump out wastes** as the best means to track septic tank cleanout wastes to ensure the environmentally sound treatment of such wastes and guard against illegal disposal of such wastes in the County.
- **The use of community septic systems should be discouraged** because of the difficulty in insuring their long term maintenance and operation.
- **The OCUA, in conjunction with the Ocean County Areawide Agency should initiate a study for the expansion of the central wastewater treatment plant when that facility reaches eighty percent of its treatment capacity,** as required by state regulations. The design of the expansion should be consistent with the overall development projected by the Ocean County Water Quality Management Plan for the OCUA's central service area as approved by NJDEP and USEPA and should reflect the abandonment of the Ortley Beach Treatment Plant.

AIR QUALITY

Transportation system sources have been identified as the primary source of air quality degradation in Ocean County. The County is responsible, under the federally required State Implementation Plan to develop and implement a reasonable, balanced plan that provides for the reduction of transportation system and stationary source emissions necessary to demonstrate attainment of National Ambient Air Quality Standards. Effective air pollution control strategies, primarily related to reducing ozone and carbon monoxide levels, must be implemented for identified non-attainment areas. Implementation plans must demonstrate the full development and evaluation of control measures and integration with the on-going planning process, particularly emphasizing the continuing, cooperative and comprehensive planning process administered by the US Department of Transportation.

The Planning Board will review all new development proposals in identified non-attainment areas considering the air quality control measures recommended in the Air Quality Control Plan. The design and location of roadways and other transportation facilities associated with development proposals shall be required to provide for the implementation of reasonably available control measures, RACM's, as specified in the plan. This requirement shall be enforced through the administration of the Ocean County Subdivision and Site Plan Resolution.

TRANSPORTATION

The transportation element of the Master Plan emphasizes the interrelationship of the total transportation system rather than a single element. It seeks to integrate all available modes of transportation into a coordinated and efficient system to meet the needs of all users. It also represents a process by which transportation improvements or new facilities are systematically conceived, evaluated as to present and future adequacy and programed for future implementation. It recognizes that transportation planning like most major planning activities is an on-going process that must reflect changes in travel demand, technologic advancement, user needs and available funding sources.

The degree to which the County's transportation system will meet existing and future demands is dependent on the continuation of a coordinated program of capital investment in transportation infrastructure. Ocean County performs a variety of transportation planning activities in a continuous, comprehensive and coordinated manner under the Subregional Transportation Planning Program. Ocean County has been designated as a subregion of the North Jersey Transportation Coordinating Council, a regional metropolitan

planning organization which includes 11 northern New Jersey counties and 2 cities. The overall purpose of this program is to carry out local transportation planning activities which advance priority transportation projects toward implementation in accordance with adopted state, regional and local plans and programs.

The Transportation Improvement Program (TIP) is a five year capital improvement program prepared as part of the Subregional Planning Program. The TIP provides an inventory of road, bridge and transit improvements to be constructed with federal and state financial assistance. The program contains a project description, funding source and identifies a schedule for completion. The TIP also contains a State Aid element which lists local projects to be funded by the State. The TIP which is prepared annually must be approved by the NJTCC, the NJ Department of Transportation and the Board of Chosen Freeholders.

Although no longer specifically required by federal statute, the Transportation System Management (TSM) component represents an important supplement to the TIP. TSM strategies involve improvements that require little or no capital investment and can be accomplished in a short period of time. These measures generally maximize use of the existing transportation network through traffic engineering techniques such as signalization improvements and traffic flow modifications.

The land use recommendations of the Master Plan will require improvements to the transportation system to efficiently serve the future development of the County. Improvements to the existing system are required to accommodate increased demand while construction of new facilities will be needed to service new areas of development. The Transportation Plan map which appears on a following page, presents the County's recommendations to meet long term transportation needs.

The Highway System

The first aspect of the plan reflects revisions to the County's functional classification of roads. These revisions have been based upon existing and projected traffic volumes from the 1990 functional classification system and other criteria established by the Federal Highway Administration in the National Highway Functional Classification Manual. The map presents the Ocean County road network according to the federal functional classification criteria.

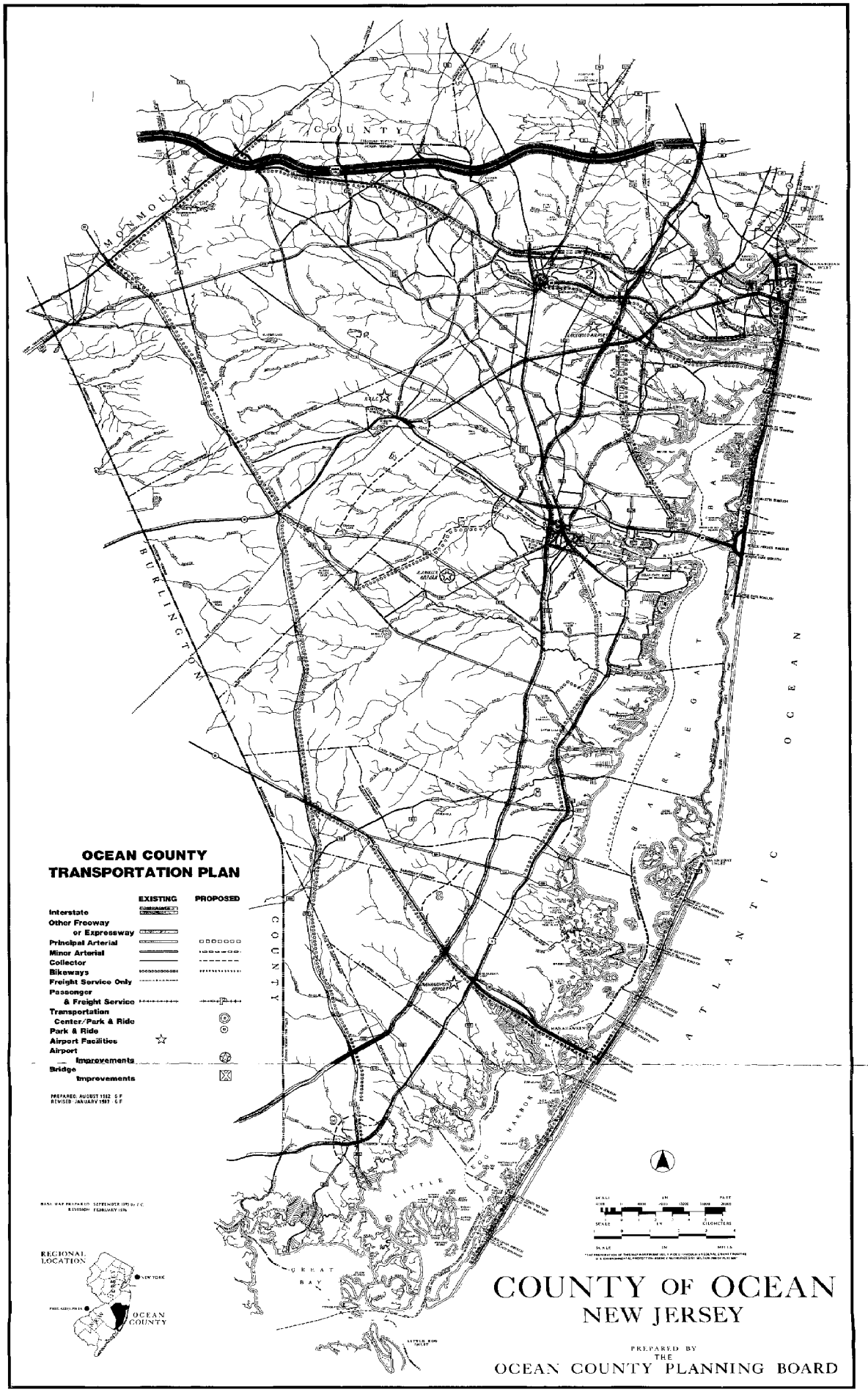
As a result of current traffic volumes and projected traffic increases there is a need to improve several major arterial and collector roadways which either are now or will be in the future deficient in capacity. The continued growth of the County reflected

in the Master Plan indicates that the arterial system which carries large volumes of intra and inter-County bound traffic will experience levels of congestion representing service levels D and E if these improvements are not made.

The following list presents necessary capital improvements to the existing road system and include short and long range measures such as rehabilitation projects, spot improvements and bridge projects. Renewal of the NJ Transportation Trust Fund would provide an important funding source toward completion of many of these projects. Specific projects and a brief description are provided in the following list. The projects have been identified according to State and County participation.

Road Improvement Projects - State of New Jersey

- **US Route 9, Intersection with Main Street, Lakewood Township to Exit 83, Garden State Parkway, Dover Township.**
  Long-range improvement project to include widening and reconstruction.
- **US Route 9, West Farms Road, Howell Township to Route 526, Lakewood Township.**
  Short-range improvement project which will entail dualization, widening and intersection improvements.
- **NJ Route 70, Burlington County border to US Route 9, Lakewood Township.**
  Long-range improvements including dualization.
- **NJ Route 70, US Route 9, Lakewood Township to Cedar Bridge Avenue, Brick Township.**
  Short-range dualization project.
- **NJ Route 70, Laurelton Circle, Brick Township to Brielle Circle, Monmouth County.**
  Long-range dualization and intersection improvements.
- **Laurelton Circle, Brick Township.**
  Short-range elimination of traffic circle.
- **NJ Route 37, Garden State Parkway to Toms River Industrial Park, Dover Township.**
  Short-range improvements to include widening and intersection improvements.
- **NJ Route 37, Garden State Parkway, Dover Township to NJ Route 70, Lakehurst Borough.**
  Long-range dualization project.


OCEAN COUNTY
TRANSPORTATION PLAN
EXISTING
PROPOSED
Interstate
Other Freeway or Expressway
Principal Arterial
Minor Arterial
Collector
Bikeways
Freight Service Only
Passenger & Freight Service
Transportation Center/Park & Ride
Park & Ride
Airport Facilities
Airport Improvements
Bridge Improvements
PREPARED: AUGUST 1982 G.F.
REVISED: JANUARY 1987 G.F.
REGIONAL LOCATION
NEW YORK
OCEAN COUNTY
MONMOUTH COUNTY
BURLINGTON COUNTY
ATLANTIC OCEAN
BARNEGAT BAY
LITTLE EGG HARBOR
GREAT BAY
COUNTY OF OCEAN
NEW JERSEY
PREPARED BY
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- **NJ Route 88, Beaver Dam Road to Memorial Drive, Point Pleasant Borough.**
  Short-range improvements and bridge replacement.
- **NJ Route 166, Jakes Branch Bridge, South Toms River Borough.**
  Short-range project involving bridge replacement.

Road Improvement Projects - Ocean County

- **Route 526, County Line Road, Kennedy Boulevard and Burnt Tavern Road.**
  Location - Brick, Jackson and Lakewood Townships.
  This project involves major improvements such as the construction of a new roadway, several curve realignments, widening and dualizaltion.
- **Route 527.**
  Location - Dover and Jackson Townships.
  This project includes three curve realignments along Whitesville Road and four widening projects which will be implemented on a phased basis.
- **Route 528.**
  Location - Brick, Jackson and Lakewood and Plumsted Townships, Mantoloking Borough.
  This roadway is proposed for several phased improvements including reconstruction and widening as well as replacement of the Central Avenue bridge.
- **Route 530, from Route 539 to Berkeley Township boundary.**
  Location - Manchester Township.
  This roadway is proposed to be widened to four lanes to the Berkeley Township boundary.
- **Route 539.**
  Location - Jackson, Little Egg Harbor, Manchester, Plumsted Townships and Tuckerton Borough.
  The two northern portions of this roadway are proposed to be reconstructed and the southern section is proposed for widening to four lanes.
- **Route 549, Hooper Avenue**
  Location - Dover Township.
  This project involves dualization and intersection improvements between Silverton and NJ Route 37, Dover Township.
- **Route 571,**
  Location - Dover, Jackson and Manchester Townships.
  This project includes widening and signalization, resurfacing, realignment and

intersection improvements.

- **Route 614, Lacey Road.**
  Location - Lacey Township.
  This project involves widening to four lanes between the Garden State Parkway and US Route 9 and also realignment at the Davenport Branch stream crossing.
- **Route 623, New Hampshire Avenue, Old Freehold Road and Cox Cro Road.**
  Location - Dover and Lakewood Townships.
  This project entails widening to four lanes and completion of a connection to Kennedy Boulevard.

Several road improvement projects identified in the Master Plan as required for completion during the planning period are located entirely or in part in the Pinelands Area. The Pinelands Comprehensive Management Plan restricts by regulation public infrastructure projects in certain land capability districts, particularly the Preservation Area. All planned road improvement projects within the jurisdiction of the Pinelands Commission require a public development approval. For those projects that are within the Preservation Area, specifically portions of the planned improvements to Route 539 and Mule Road, it will first be necessary to obtain a waiver of strict compliance from the literal provisions of the Pinelands Comprehensive Management Plan.

There will also be a need to construct new County road facilities or to extend existing facilities to service areas projected for growth. The new facilities appear on the Transportation Plan map and are described in the following section. The numeric designations correspond to the project location on the Transportation Plan map.

1. **County Line Road - Kennedy Boulevard Improvements.**
   Location: Lakewood Township.
   Right-of-Way Requirements: 120 feet.
   This improvement consists of road widening improvements on County Line Road from the Jackson Township boundary to Kent Road, intersection improvements at Kent Road and Kennedy Boulevard, and the extension of Kennedy Boulevard from Squankum Road to Ridge Avenue. These improvements will relieve congestion on County Line Road and provide service improvements in the Jackson Township, Lakewood Township area.
2. **New Hampshire Avenue Extension.**
   Location: Lakewood Township.
   Right-of-Way Requirement: 80 feet.
   This extension will connect Ridge Avenue to Kennedy Boulevard Extension. The

project will relieve traffic congestion in the Lakewood area by providing a linkage consistent with proposals for the US Route 9 bypass.

3. **Fischer Boulevard Extension.**

   Location: Dover Township

   Right-of-Way Requirement: 100 feet.

   This improvement is required to provide a connection between NJ Route 37 and NJ Route 70 which will alleviate congestion in areas of Brick Township. A subsequent extension to Cedar Bridge Avenue will relieve congestion near Brick Plaza. This roadway will serve as a major through-traffic route, acting as a primary artery in a future high growth area.

4. **NJ Route 70 – Route 530 Connector (School House Road – Colonial Drive)**

   Location: Manchester Township.

   Right-of-Way Requirement: 80 feet.

   This proposed local collector indicates the need for an alternate east-west route for local traffic. It is intended to provide improved access to the developed area of Whiting and provide for continued development within the Whiting Pinelands Village.

5. **Mule Road Extension.**

   Location: Berkeley and Lacey Townships.

   Right-of-Way Requirement: 100 feet.

   This connection will provide a major north-south collector between NJ Route 37, Route 530 and Route 614 (Lacey Road). The roadway will serve a Regional Growth District and provide an alternative to US Route 9 and NJ Route 37 for residents of western Berkeley Township. It will improve access to the R. J. Miller Airpark and other County facilities. It will also function as an emergency evacuation route and provide improved access for emergency services.

6. **Route 532 – Access Roadway**

   Location: Ocean Township.

   Right-of-Way Requirement: 80 feet.

   This proposed collector roadway will provide access to the designated County Resource Recovery site and areas designated for industrial development by the township.

7. **Seventh Street Extension.**

   Location: Ocean Township.

   Right-of-Way Requirement: 60 feet.

This roadway will connect the Pebble Beach area with Main Street in Waretown, Ocean Township. The roadway will provide a secondary route parallel to US Route 9 and will reduce local trips along Route 9 during peak periods. It will also function as an emergency evacuation route.

8. **Stafford-Barnegat Collector.**

   Location: Barnegat and Stafford Townships.

   Right-of-Way Requirement: 80 feet.

   This roadway will serve as a collector facility between NJ Route 72, Stafford Township and Route 554, Barnegat Township for residential traffic generated by new development in the Ocean Acres area. This area has been designated as a Regional Growth District under the Pinelands Comprehensive Management Plan.

9. **Tuckerton Bypass.**

   Location: Tuckerton Borough

   Right-of-Way Requirement: 60 feet.

   This roadway will divert through traffic from US Route 9 and downtown Tuckerton. North and south-bound traffic has increased significantly as a result of casino development in Atlantic City and development in Regional Growth Districts in the southern municipalities.

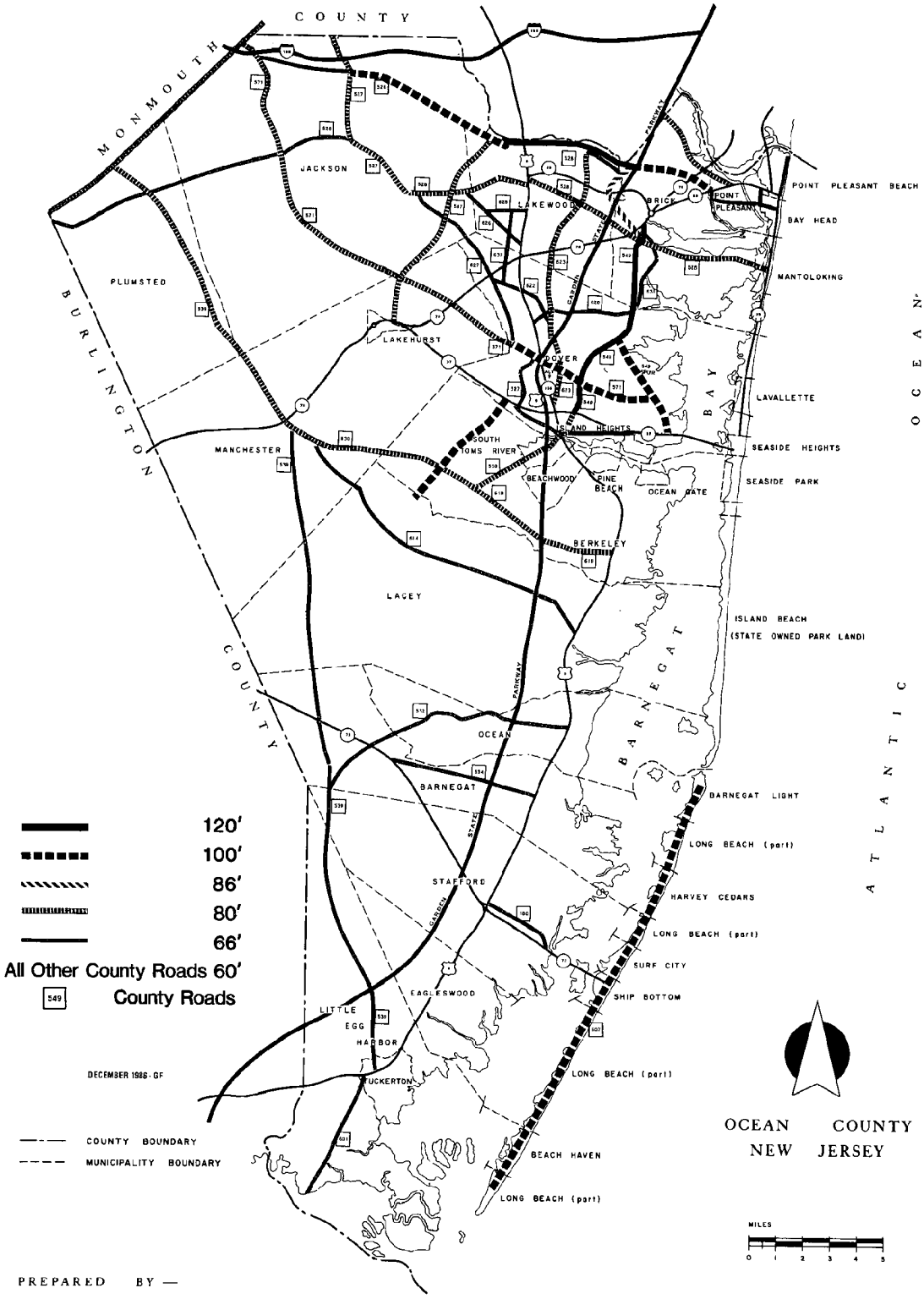
Highway Improvements

Two major State highway projects involving limited access highways have been proposed for the Ocean County area. The first project is a proposal by the New Jersey Highway Authority to construct a phased series of improvements along the Garden State Parkway between Asbury Park in Monmouth County and Lacey Road in Ocean County.

To facilitate traffic flow several proposals have been developed. In Ocean County, the improvements would consist of a major widening program from the Asbury Park Toll Plaza to the Toms River Toll Plaza in Dover Township. The road section between Exit 91 in Lakewood Township and the Toms River Toll Plaza will be widened to three lanes in each direction and will also include a shoulder lane. The New Jersey Highway Authority has also proposed the construction of a feeder road system parallel to the Garden State Parkway to facilitate access from the Brick and Lakewood areas.

Several proposals involve the creation or improvement of interchanges along the highway. A partial interchange at Pinewald-Keswick Road in Berkeley Township has been proposed. This project was initially denied a CAFRA permit by the Division of

Figure 3-8
Rights of Way for County Roads



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* OCEAN COUNTY PLANNING BOARD *

Resources because of concern over potential secondary impacts. This proposed project should be reevaluated in consideration of the adoption and implementation of the Pinelands Comprehensive Management Plan that should serve to address these concerns. In addition the Lacey interchange is proposed to be upgraded to a full interchange with a toll booth on the access lane.

Other municipalities have requested that the New Jersey Highway Authority consider additional interchanges to improve access to their communities. These proposals will be evaluated through a comprehensive study now being conducted by the New Jersey Highway Authority. Ocean County has also proposed the creation of a full interchange at Exit 69, in Ocean Township. The interchange is needed to serve the planned resource recovery facility and associated traffic. The New Jersey Highway Authority has granted approval for the improvement. The County should proceed to negotiate the terms of construction with the Highway Authority to complete the improvement in conjunction with the scheduled operation of the resource recovery facility.

The Planning Board supports the construction of phased improvements to the Garden State Parkway as necessary to relieve congestion at peak travel times, especially seasonally, and to provide for projected increases in travel demand associated with future development. The proposed interchange improvements will increase access to areas designated as appropriate for additional development in the Master Plan. However, improvements to the Garden State Parkway must be planned and constructed with improvements to the major state and County road systems which feed the Parkway to ensure that the local highway system is not over capacitated.

In 1972, a second major regional highway was proposed for the Ocean County area, known as the Alfred E. Driscoll Expressway. The New Jersey Turnpike Authority suggested construction of a limited access highway extending 35 miles from the New Jersey Turnpike in South Brunswick Township, Middlesex County to Exit 83 of the Garden State Parkway in Dover Township. The intent of the proposed new roadway was to ease traffic congestion problems, especially during summer weekends, by providing a major east-west link through an emerging suburban growth corridor. Engineering design, preliminary construction plans and specifications were completed for the project. However, construction activity was not initiated following a series of public hearings on the proposal. In the mid-1980's, the Turnpike Authority authorized the sale of land parcels contained within the acquired project right-of-way. Reactivation of the Driscoll Expressway proposal is considered improbable due to the disbandment of the right-of-way.

It is improbable that any new regional roadway projects will be proposed for Ocean County during the planning period covered by the Master Plan. In the event that such

Figure 3-9
Road Improvement Plan

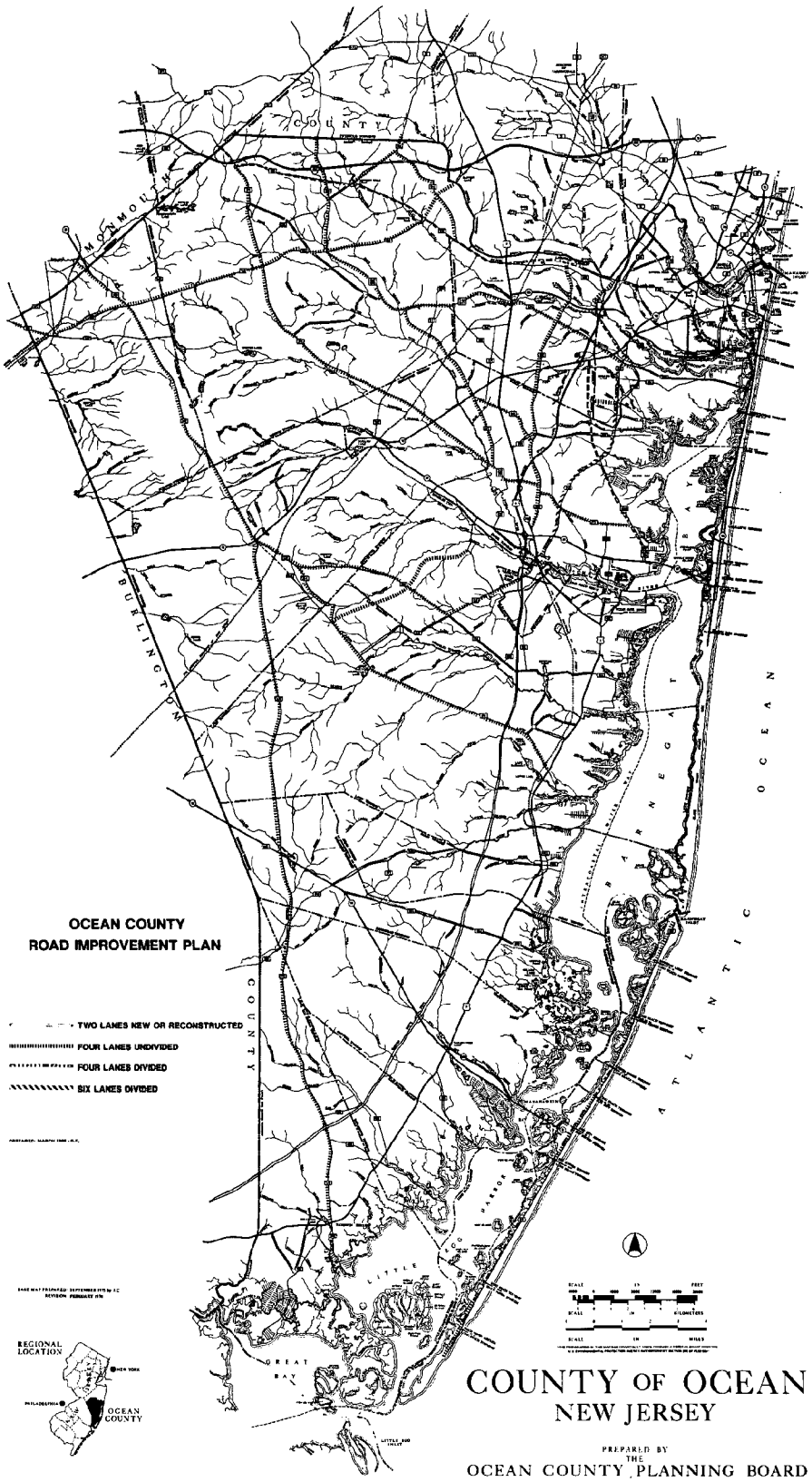


Figure 3-10
Lakewood Transportation Center - Concept Plan

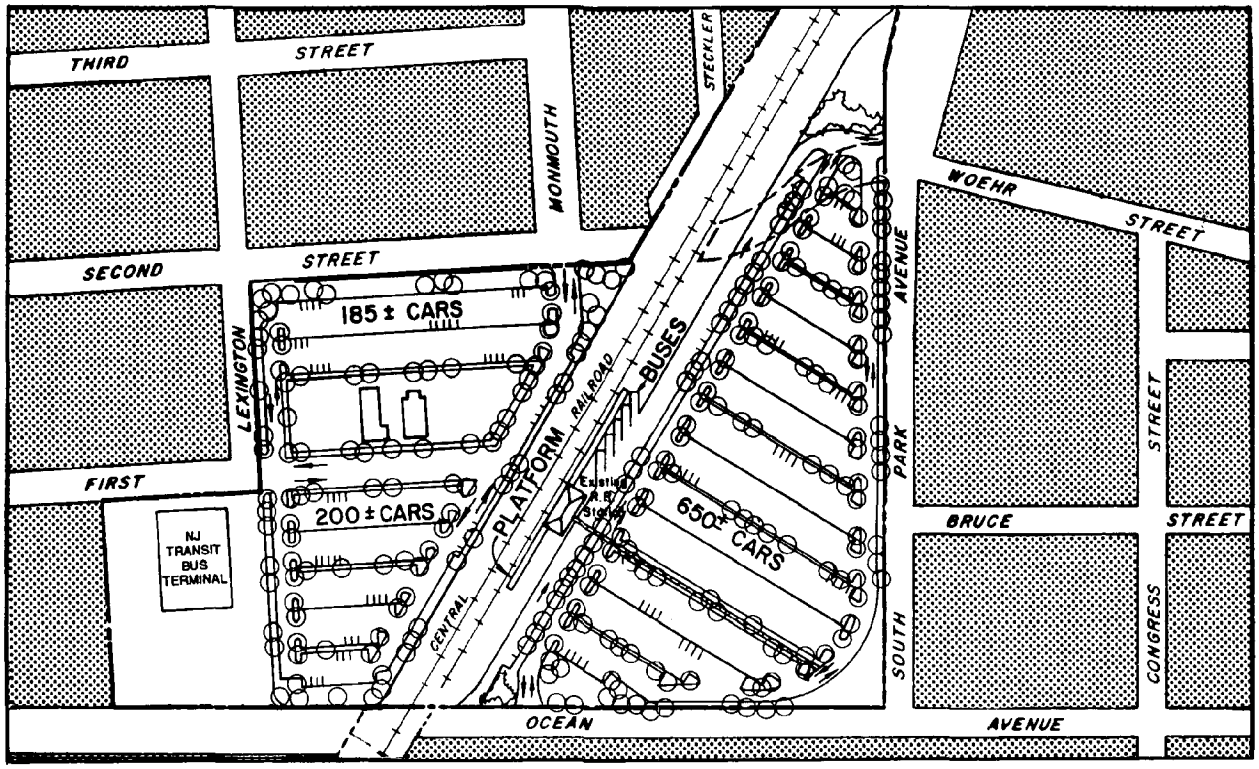


Figure 3-11
Toms River Transportation Center

a proposal was forthcoming, a careful and comprehensive evaluation of its impacts must be completed by the Planning Board. This review should specifically address secondary impacts, particularly on the land use recommendations of the Master Plan and its transportation plan element.

Public Transit

Integration of the existing and future highway system with public transportation facilities is a major goal of the County Master Plan. This requires the development of regional transportation centers to serve a multi-modal function. The Master Plan recommends the establishment of two regional centers in Ocean County. The primary facility would be located in Lakewood Township, which would service the most densely populated part of the County and which has the potential to integrate both bus and rail transit with the highway system. The other center is proposed for Toms River, Dover Township and would service the area projected to be one of the most rapidly developing areas of the County.

Lakewood Transportation Center

This facility is proposed for "downtown" Lakewood at the intersection of Ocean Avenue and the Southern Branch rail line. The project site comprises 26 acres and would provide for a multi-modal facility incorporating the existing bus terminal, existing parking facilities for the present terminal and the Central Business District and future parking and service facilities for restored passenger rail service.

The Lakewood Transportation Center is envisioned as the primary commuter terminal servicing northern Ocean County and is consistent with the proposal to restore passenger rail service to this region. Completion of this facility would facilitate the needs of commuters and would also contribute to the successful redevelopment of downtown Lakewood by improving access and parking in the CBD, and by attracting increased commuters to the downtown area.

Toms River Transportation Center

This facility is located on a site adjacent to Exit 81 of the Garden State Parkway on Highland Parkway Extension. The multi-modal facility currently provides a park and ride facility for bus commuters but has the potential to serve rail commuters as well. A new bus terminal serving this facility was recently completed.

The facility is within walking distance of the Toms River Central Business District and the County and Dover Township office complexes. The facility is operated by the Dover Township Parking Authority.

The Toms River Transportation Center is envisioned as the major commuter terminal serving central Ocean County. Consistent with the proposed facility are a series of road and pedestrian access improvements as specified in the Dover Township Master Plan. The Dover Plan calls for a "ring road" to bypass congestion in Toms River, fringe parking facilities surrounding the Central Business District, establishment of auto-free zones and improved pedestrian circulation. Provision has also been included for future jitney service.

Park and Ride Facilities

Ocean County is served by the NJCL, and restored passenger rail service to Lakewood is proposed.

Park and Ride facilities, established to serve public transit or car and van pool riders, can contribute significantly to a reduction in the number of vehicles in congested areas at peak travel periods. These facilities also reduce the need for increased parking in areas such as central business districts by reducing the number of spaces needed by commuters. The Master Plan recommends the establishment or improvement of park and ride facilities at the locations shown on the Transportation Plan map. In addition, smaller community based facilities should be considered to supplement the larger regional park and rides.

Passenger Rail Service

The Planning Board, in cooperation with the Ocean County Board of Public Transportation, has evaluated the potential for restoring passenger rail service to Lakewood Township in two technical reports released in 1980 and 1986. Passenger rail service had been provided to Lakewood from the 1800's until the 1940's. Restoration of passenger rail service would provide the opportunity for an efficient, energy conserving public transit system serving northern Ocean County and southern Monmouth County. This bi-County region has been and continues to be one of the most rapidly developing areas in the State.

In 1986, the NJ Department of Transportation and NJ Transit initiated a comprehensive planning study focusing on potential future transit alternatives for the Monmouth/Ocean region. The study area was later expanded to include Middlesex County as well. Due to the rapidly developing nature of the study area, the study is structured to determine if additional commuter rail service improvements are warranted. The study will focus on future travel demand and potential transit solutions. These solutions are expected to contain a balanced, multi-modal approach which will include commuter rail service as well as improved bus service along the Route 9 corridor. In addition, the proximity of adequate park and ride locations has emerged as an important factor in the study effort. If the findings of this study indicate that major new public transit investments are warranted, an alternatives analysis and environmental assessment of the most suitable transit options will follow.

In response to the emerging development patterns of the state, two major capital improvement projects have already been initiated to either improve or restore passenger rail service outside the Ocean County region. The first project will extend electric rail service along the North Jersey Coast Line to Long Branch in Monmouth County. The second project will provide restoration of passenger rail service between Philadelphia and Atlantic City. The Southern Branch rail line intersects with the Atlantic City Mainline, providing an existing intra-state rail link between North and South Jersey. Its improvement would therefore provide the opportunity for a restored intra-state rail passenger service linking these areas.

The Planning Board recommends that passenger rail service be restored to Lakewood. Reactivation of commuter rail service would provide the best use of the existing rail infrastructure and would contribute to improvements in air quality levels and extend the useful life of area roadways. Consideration should be given to extending passenger rail service from Lakewood to Atlantic City, thereby providing for intra-state rail service.

Barnegat Inlet Improvements

Barnegat Inlet is one of the most heavily utilized inlets on the East Coast. It is also one of the most dangerous, experiencing constant shoaling conditions. The US Army Corps of Engineers maintains the inlet as a federal navigation project. While improvements were constructed by the federal government in 1939 and 1944, the improvements have failed to maintain a suitable and safe channel for navigation. The Army Corps of Engineers has identified several measures which will modify the existing federal navigation project at Barnegat Inlet:

- **Construction of a new south jetty** along an alignment generally parallel to the existing north jetty from the groin, located near Barnegat Lighthouse, seaward to the existing south jetty light, and the provision of a suitable navigation aid on its outermost end.
- **Dredging and maintenance of a channel** approximately 11,000 feet long, 300 feet wide to a depth of 10 feet below Mean Low Water from the outer bar in the Atlantic Ocean to the Barnegat Lighthouse, thence following natural deep water to the north end of the existing sand dike in Barnegat Bay.
- **Removal of the shoal** located between the proposed navigation channel and the north jetty.
- **Placement of all dredged material** on a Long Beach Island feeder beach located approximately 1.1 miles south of the existing south jetty.
- **Provision of a jetty sport fishing facility** consisting of a paved walkway and safety railing on the new south jetty which is accessible to all persons.

The passage of the 1986 Water Resources Development Act provided nearly 40 million dollars to complete these measures. The non-federal share is estimated at 14 million dollars, the cost of which will be shared by the State and County. The Planning Board supports construction of these measures to improve the safety and stability of Barnegat Inlet. The inlet is the most important and frequently used access point to the Atlantic Ocean from Barnegat Bay for pleasure boats, recreational and commercial fishing vessels. While Barnegat Inlet is recognized as being of vital importance to vessels docked in Ocean County, it is also extensively used by vessels registered in other areas of the State and out-of-state vessels navigating the Intracoastal Waterway. Maintenance of the Inlet and feeder channels falls within the jurisdiction and responsibility of the State and federal governments and should be accomplished on a scheduled basis.

Public Airport Facilities

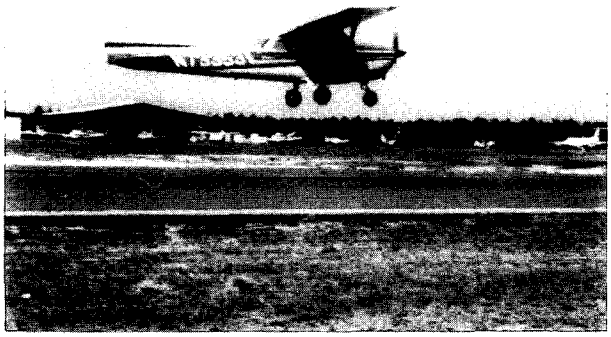
Public airport facilities in Ocean County provide both general aviation and military flights and represent a significant investment of public funds. Operation of these facilities is an important factor in the County's economy, both through direct employment and as economic generators. The Lakehurst Naval Air Engineering Center, for example, is the largest single employer in Ocean County with more than 2,000 employees. The annual payroll results in millions of dollars of expenditures in the local economy. The availability of general aviation facilities is an increasingly important consideration in industrial and

corporate locational decisions. Large scale office complexes, particularly corporate facilities, require facilities for both private aircraft and fixed-base carriers.

The Planning Board recognizes the importance of present airport facilities to the County's economy and their potential for stimulating the economic development of the County. To provide for the continued viability and development of airport operations, the Planning Board presents the following recommendations for federal and County airport facilities.

Robert J. Miller Airpark

The Robert J. Miller Airpark Master Plan presents recommendations for improvements to facilities and operational procedures to meet the long term needs of public aviation in Ocean County. The Airpark represents a substantial County investment and has tremendous potential as an element of an overall economic development program for Ocean County. In order to realize the economic development potential of the Airpark and to provide for the projected level of demand for air transport services the Planning Board supports the completion of the following improvements:



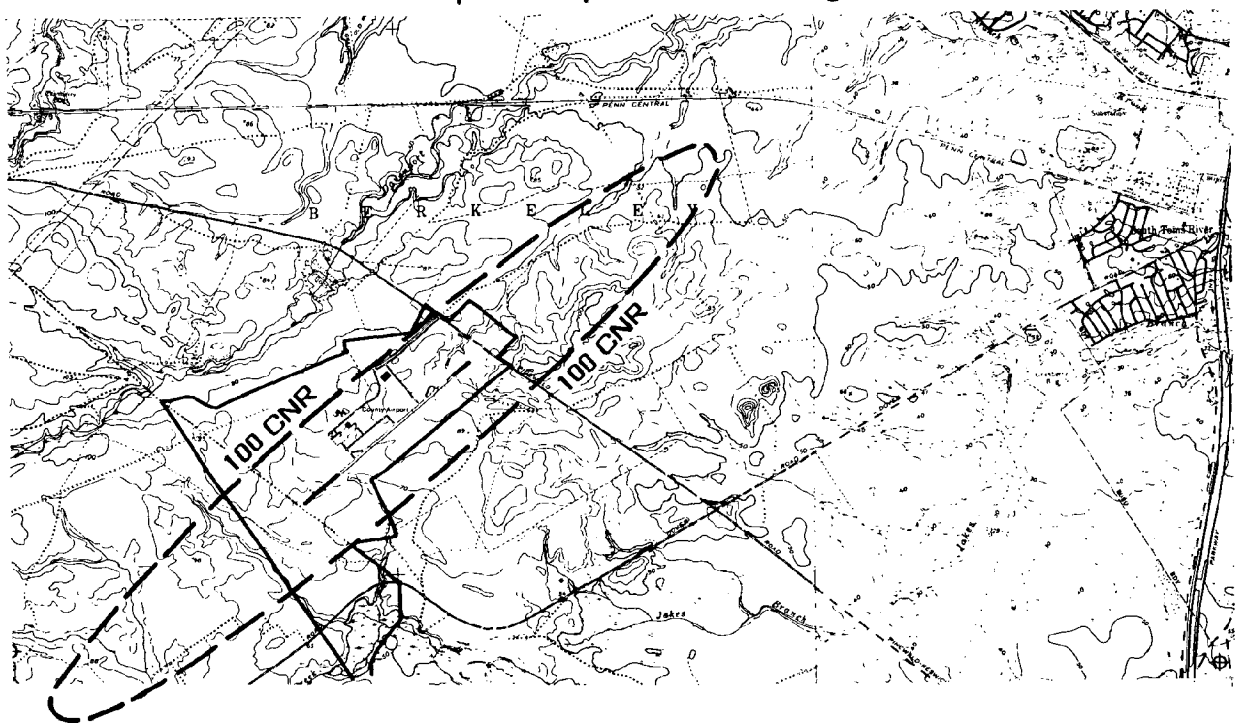
Robert J. Miller Airpark is the major public airport facility in Ocean County providing basic transport services.

- **Widen runway 6-24** to meet the Federal Aviation Administration dimensional criteria established for general transport facilities.
- **Construct a crosswind runway and taxiway** at an orientation of 140° and 320°. This runway will increase the airport capacity and improve safety at the Airpark.
- **Install high intensity lighting** on the precision instrument runway 6-24 and medium intensity lighting on the crosswind runway, taxiways and apron areas.
- **Install an approach lighting system (MALSR)** to provide additional safety, especially during inclement weather.
- **Install visual approach slope indicators (VASI)** along the crosswind runway as a safety feature.
- **As air traffic increases, construct a control tower** to provide for the efficient and safe movement of aircraft at the Airpark.

- **Develop additional apron space** for the tie-down areas and "T" hanger areas.
- **Expand conventional and "T" hanger facilities** to accommodate both existing and projected demands for individual aircraft and fixed base operator activities.
- **Construct a new terminal** located south of the present facility. This facility should include parking facilities to service the terminal building.
- **Expand parking capacity** adjacent to the "T" hangers and near the playground and picnic area.
- **Extend the access road** to the "T" hanger area to provide an additional access point at Mule Road.

To protect public health, safety and welfare and to ensure the continued viability of airport opertions, the Airpark Master Plan presents recommendations on appropriate land uses located in the accident clear zones and flight paths. These recommendations are consistent with FAA noise and safety regulations and include both present and projected requirements. The County has already acquired the required accident clear zone. The Planning Board recommends that land development in the flight path noise corridors for the projected 1995 100 CNR contours as designated in the following figure be consistent with the off-site land use requirements of the Airpark Master Plan. Development within this designated area will be required to meet FAA regulations for air space review.

Figure 3-12
RJ Miller Airpark Composite Noise Rating Contour



Lakehurst Naval Air Engineering Center

The mission of the Lakehurst Naval Air Engineering Center is primarily the research, engineering, development, testing and limited production of devices to aid in the operation of naval aircraft and their weapon systems. To accomplish this task the Center provides training facilities for personnel and airport facilities for fixed wing and rotary wing aircraft.

To protect the health, safety and welfare of both military personnel and the surrounding residential population, the US Navy prepared the Air Installation Compatible Use Zone (AICUZ) Study in 1976. This study identified land areas both on and off the base that were impacted by noise or safety hazards. The total land area affected by these constraints was 3,735 acres of military property and 2,925 acres of non-military property.

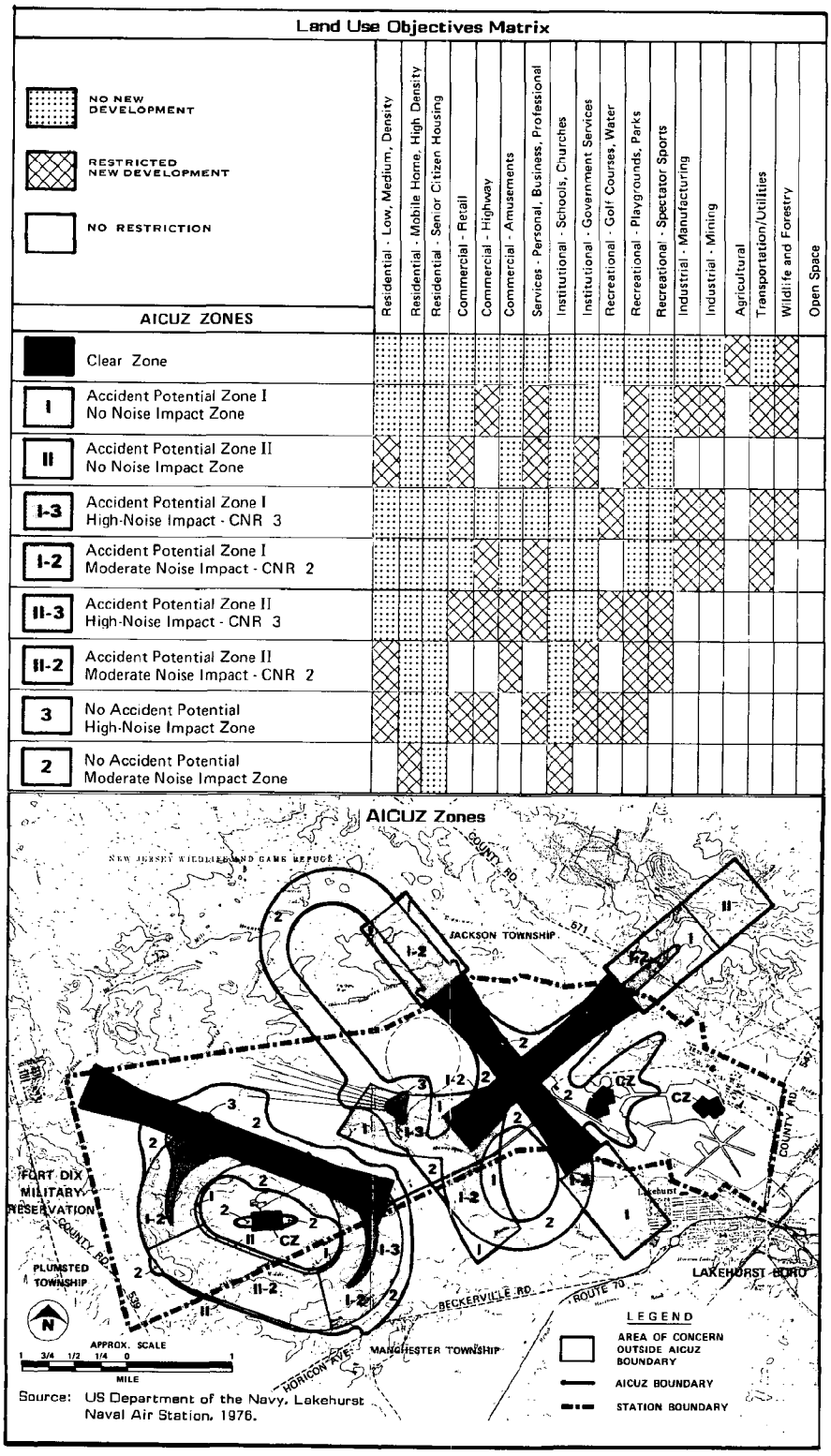
The map on the following page illustrates the accident clear zones, flight paths and land use recommendations designated by the AICUZ plan. The land use recommendations of the County Master Plan are consistent with the AICUZ suggested land uses for these areas. The Planning Board recommends that municipal land use plans and land development ordinances be revised to conform to the AICUZ plan as needed.

Bikeway Facilities

Bicycles are playing an increasingly important role for recreational and personal transport. The Planning Board supports the creation of bikeways, bikepaths or bike lanes as part of either private land development or as a part of improvements to public roadways. However, it is recognized that the provision of bikeways on roadways is dependent on a careful evaluation of safety criteria. When feasible and safe, the Planning Board recommends that bikeways be coordinated in conjunction with County road improvement programs. The following specific bikeway projects should be reviewed for their future development potential either individually or as part of County road improvements.

- **Former Central New Jersey railroad right-of-way** extending from South Toms River to Barnegat Township.
- **Bay Boulevard**, Dover Township, from NJ Route 35 and Lavallette Borough which will eventually extend to the proposed Route 528 (Mantoloking Road) bikeway.
- **NJ Route 35**, Mantoloking Borough from the intersection with Mantoloking Road north along NJ Route 35 to Ocean Avenue, Point Pleasant Beach Borough.
- **County Route 530**, Manchester Township beginning at NJ Route 70 and extending along Route 530 to Schoolhouse and Lake Roads, Manchester Township.

Figure 3-13
Air Installation Compatible Use Zones (AICUZ), Lakehurst NAEC



Source: US Department of the Navy, Lakehurst Naval Air Station, 1976.

- **Mule Road,** the entire length from intersection with NJ Route 37, Dover Township to intersection with Lacey Road, Lacey Township.
- **Haines Road,** from Barnegat Drive in Lacey Township extending from US Route 9 to Lacey Road along Haines Road and Western Boulevard.
- **Long Beach Boulevard** beginning at Holgate and connecting with the existing Beach Haven bikeway and then extending to Ship Bottom Borough.
- **Long Beach Boulevard** extending from Surf City Borough to Barnegat Light Borough.
- **Mantoloking Road** extending from Mantoloking Borough to Brick Township and connecting with the proposed Fischer Boulevard Extension.
- **Fischer Boulevard,** Dover Township from NJ Route 37 to NJ Route 70 (including portion of Fischer Boulevard extension).
- **County Route 537** extending through Jackson and Plumsted Townships.
- **County Route 539** extending from Monmouth County border to Tuckerton Borough.
- **NJ Route 72** extending from County Route 539 to Long Beach Boulevard, Ship Bottom Borough.
- **Connector link between Interstate 195 and County Route 549** in Brick Township including proposed bikeway through Lake Shenandoah Park.

The location of all proposed bikeways are designated on the Transportation Plan map. They are generally located to provide bicycle access to major trip generators and to take advantage of major recreational and scenic areas. Implementation of the bikeways recommended in the State Trails Plan should also be encouraged. The bikeways proposed in the Transportation Plan map are consistent with this Plan.

SOLID WASTE

The environmentally safe disposal of solid waste is one of the most critical issues facing Ocean County. Groundwater resources have been demonstrated to be very susceptible to contamination and areas of the County have already been impacted by the improper or illegal disposal of wastes.

The Board of Chosen Freeholders has adopted a plan to provide for the management and disposal of solid waste in Ocean County. The Ocean County District Solid Waste Management Plan and subsequent amendments provide for the environmentally safe disposal of solid waste generated within Ocean County. This plan has been approved by the Commissioner of the NJ Department of Environmental Protection. Certain provisions

of the District SWMP have been incorporated into an Administrative Order between the Department and the County.

The Ocean County District Solid Waste Management Plan contains three components. As a means to meet the immediate solid waste disposal needs of Ocean County it designates two regional landfills to serve the two waste districts defined in the plan. The regional landfills must incorporate environmental safeguards in their design, construction and operation consistent with the regulations of the NJ Department of Environmental Protection. All other landfill facilities accepting solid waste are designated for closure, and the plan presents specific recommendations for closure and future land uses on or adjacent to the closed facilities.

The second component involves the implementation of an aggressive County-wide recycling program. The plan sets a goal of recycling 25 percent of the solid waste generated in Ocean County and sets forth specific strategies to accomplish the annual volume goals for recycled materials.

The third component provides for the development and operation of a resource recovery facility. The Board of Chosen Freeholders has designated a site for the resource recovery facility in Ocean Township (Waretown) and the County is proceeding to prepare the required Environmental and Health Impact Statement for the site. The Administrative Conset Order requires the County to initiate construction in 1990 and the resource recovery facility must be operational by 1992. The northern regional landfill will dispose of non-recyclables and the residual produced by the resource recovery facility.

The Planning Board supports the implementation of the Ocean County District Solid Waste Management Plan. The Board also presents the following general and specific recommendations to provide for the safe and responsible solid waste disposal needs of the County:

- The County is urged to **continue efforts to evaluate resource recovery technology and to construct a facility** at the Ocean Township site as approved in the County's *Solid Waste Management Plan.*
- The County should **develop and implement a County-wide recycling program** which will reduce the amount of solid wastes requiring disposal at landfills and to recover the resource value of recycled materials.
- **Regional landfill facilities should continue to implement state-of-the-art, upgraded environmental engineering features** such as liners and leachate collection systems to ensure environmental protection.
- All landfill operations should **prepare closure plans consistent with state**

environmental and engineering standards. Future land development on or adjacent to abandoned, closed, designated or operating solid waste disposal facilities must conform to the recommendations of the Ocean County District Solid Waste Management Plan and Subdivision and Site Plan Resolution.

- To insure the provision of sufficient capacity to meet the solid waste disposal requirements of Ocean County, **out-of-County wastes should be prohibited from disposal at County facilities.**
- To protect the quality of the County's environmental and water resources, **no facilities designed to dispose or treat hazardous and toxic wastes should be located within the County.**
- **The County supports state, federal and County permit, monitoring and inspection programs** such as the NJPDES and Solid Waste Control Program to regulate solid waste disposal facilities.
- **The County supports the continuation of federal and state legislation** which provide financial assistance to clean-up designated hazardous waste disposal sites.

PARKS, RECREATION AND OPEN SPACE

Recreation is a basic human need and provides an escape from the tensions of everyday life. The objective of this section of the Master Plan is to provide a framework for required increases in the number, quality and variety of recreational opportunities to meet the needs of present and future residents and visitors to Ocean County.

Each level of government, together with the private sector, plays an important role in providing the recreational facilities needed in Ocean County. The federal government acquires and manages land and natural areas of national significance, such as the national wildlife refuges and the Pinelands National Reserve. It also serves as a funding agency to assist state and local governments with open space acquisition and recreational facility development projects.

The state government focuses on providing facilities for activities which are extensive in nature and which protect significant land and water resources. The state also maintains certain historic sites of statewide significance. An increasingly important role for the state is as a funding and planning agency through the Green Acres program.

The role of the County is to acquire, develop and maintain parks and to administer public recreation programs that serve the needs of all segments of the County's population. These facilities should be easily accessible and should provide convenient facilities for those activities which are commonly engaged in close to an individual's residence.

Generally, County parks and recreational facilities supplement municipal park systems with extensive facilities that are based on intercommunity service.

Municipal governments provide and administer the most intensely developed, user-oriented public facilities which are easily accessible to local neighborhoods. Municipal facilities also normally include lands and buildings under the control of local Boards of Education.

An accurate method of determining recreational requirements is through an activity needs analysis. In 1984, the NJ Department of Environmental Protection completed a detailed activity analysis as part of the Statewide Comprehensive Outdoor Recreation Plan (SCORP). The basic methodology employed in this study was to apply facility capacity standards for 17 outdoor recreation activities to determine the capacity of a given facility. Projected demand figures were then applied to the capacity of the existing facility supply to determine needs through the year 2000. The annual demand figures were then converted to estimates of peak average daily demand. The year 2000 recreational facility needs for Ocean County as determined in the SCORP are presented in the table on the following page.

Fishing and crabbing are popular activities, and public access to the waterfront must be maintained.

The facility surpluses and deficits noted in the proceeding table reflect overall conditions and do not necessarily indicate actual conditions at the local level. Moreover, the recreational deficits include areas of responsibility for all levels of government and the private sector, not just County facilities. However, they provide important indicators of the need for particular types of facilities and can be further refined by assessment studies conducted by the appropriate park planning agency.

In Ocean County, significant deficits are expected in the facilities needed to satisfy peak demand for salt water swimming, salt water boating and fishing, bicycling, family picnicking, tennis and field sports. It is important to note that deficits for the saltwater activities are primarily a function of access and do not reflect the vast recreational use of Barnegat Bay or the Atlantic Ocean. In many instances, the need for swimming facilities, for example, may be met by swimming from a pleasure boat. The need for improved access to these water bodies is recognized, however.

Table 3-10
Open Space Requirements According to Population Standards for Ocean County

Requirements	State	County	Municipal
1980			
Population	346,038	346,038	346,038
Acres Required	8,304	4,152	2,768
Provided	54,097	2,070	2,177
Deficit (+Surplus)	(+45,793)	2,082	591
1990			
Population	471,100	471,100	471,100
Acres Required	11,304	5,652	3,768
Provided	54,097	2,070	2,177
Deficit (+Surplus)	(+42,973)	3,582	1,591
2000			
Population	560,400	560,400	560,400
Acres Required	13,440	6,720	4,480
Provided	54,097	2,070	2,177
Deficit (+Surplus)	(+40,657)	4,650	2,303

Source: Ocean County Planning Board, 1982.

Table 3-11
Year 2000 Ocean County Recreational Facility Needs

Activity	1982 Capacity	2000 Demand People	2000 Facility Needs
Freshwater Swimming	16,790	46,293	29,503
Saltwater Swimming	361,152	427,675	66,524
Family Picnicking	6,465	9,287	2,823
Freshwater Boating and Fishing	4,727	5,135	409
Saltwater Boating and Fishing	73,611	98,413	24,803
Regulation Golf	2,550	4,280	1,731
Camping	5,912	6,987	1,076
Hunting	3,297	14,481	11,185
Ice Skating	75,932	24,432	+(51,500)
Hiking	6,600	24,117	17,517
Horseback Riding	1,668	2,734	1,066
Bicycling	9,100	86,908	77,809
Baseball/Softball	9,850	17,632	7,783
Football/Soccer	6,480	16,751	10,272
Tennis	5,184	21,957	16,773
Basketball	7,960	2,743	+(5,211)
Playground Activities	23,600	5,357	+(18,243)
Total	620,878	815,182	194,320

Notes: Data expressed in Activity Days.
Facility Deficits or (Surpluses) represent the extent to which 2000 supply can meet 1980 peak day demand.

Source: New Jersey Statewide Comprehensive Recreation Plan, 1984.

The County is responsible for providing facilities identified as deficient through its continuing park acquisition and development program. As part of its recreational planning effort, the Ocean County Parks and Recreation Department has prepared an overall strategy for park development based on five regions. These regions reflect an assessment of the characteristics and recreational needs of residents, the existing opportunities available to them, and watershed boundaries.

The regions can be classified as the **Northeast** encompassing Lakewood and parts of Brick and Jackson; the **Northwest** comprised of the remainder of Jackson, Plumsted, northern Manchester and northwestern Dover; the **Tidewater** consisting of parts of Brick, Dover, Island Heights and the Barnegat Peninsula; the **Central** consisting of Berkeley, Ocean Gate, Pine Beach, Beachwood, South Toms River and Lacey; and, the **Southern** encompassing Ocean, Barnegat, Stafford, Eagleswood, Tuckerton, Little Egg Harbor and Long Beach Island.

Wells Mills Park combines the protection of sensitive areas with the need for recreation.

A comprehensive parks program should meet not only the recreational needs of existing and future residents, but also further the goals of protection of environmentally sensitive areas including headwaters, stream corridors, flood plains, water quality and the preservation of open space. The County's parks program, in conjunction with the Planning Board's land use recommendations embodied in the Master Plan, could contribute significantly to the maintenance of the County's character and the overall achievement of the Master Plan's goals and objectives.

The Planning Board encourages the Board of Chosen Freeholders and the County Parks and Recreation Department to consider multiple use in future land acquisitions. Public acquisition of stream corridors, flood plains, headwaters and wetlands protects these areas from inappropriate development while still providing necessary recreational opportunities and access to water for boating and swimming. These areas can also serve as buffers and transition zones between developed areas and can provide greenbelts linking existing publicly-owned lands. Public acquisition of aquifer recharge areas as open space would help ensure the future availability of water supplies.

Another important planning concept is reserving future park sites in areas identified as appropriate for future development before land values escalate or suitable sites are developed for other uses. Based upon an evaluation of anticipated growth in the County reflected in the Master Plan, the Planning Board foresees a need for additional active recreational facilities in the Tidewater region to supplement the passive recreation provided by both public and private facilities in the coastal area. In the Northeast, Ocean County Park provides both active and passive facilities but with increased population growth there will be a need for expanded facilities.

In the Northwest, there are no existing County facilities. A major County facility should be located here to serve projected population increases in Jackson, Dover and Manchester and should be located in close proximity to developing areas with good access to the recreational facility.

The future needs of the Central region can probably be met with the expansion and development of the recreational facilities at the Robert J. Miller Airpark. Also, the County should seek access to the Cedar Creek to expand the range of recreational opportunities to this region.

The Southern region has several small County parks with active facilities which have recently been upgraded and the recently acquired Wells Mills Regional Park which will provide passive recreational facilities. However, this area is projected to increase in population and there is a need for a least one additional regional County park facility to provide active recreation. The first priority would be a facility located in the Manahawkin area of Stafford. Future needs beyond the planning period of the Master Plan will probably require a facility in the southern portion of the region in the Little Egg Harbor - Eagleswood area as well.

The Ocean County Planning Board offers the following general and specific recommendations to provide for the open space, park and recreational needs of Ocean County.

- **The state, through the Office of Green Acres in the New Jersey Department of Environmental Protection should complete the program of acquisition called for in the Pinelands Comprehensive Management Plan.** Successful completion of this program would result in the protection of environmentally sensitive areas, provide recreational opportunities and link important public land areas. More than 14,000 acres would eventually be acquired in the Westecunk Creek, Toms River, Cedar Creek and Oyster Creek drainage basins.
- **The County should continue with the acquisition of property adjacent to the**

stream corridors of the South and North Branches of the Metedeconk River, and buffers along Lake Shenandoah and Cedar Bridge Avenue. These acquisitions link Lake Shenandoah Park with Forge Pond, a County-owned area in Brick Township planned for development as a golf course and active recreation facility. Continued acquisition would provide a necessary expansion of County park facilities in a heavily populated portion of the County and protect the integrity of existing facilities.

- **The County should proceed with the acquisition of land along Cedar Creek** as an expansion of the Robert J. Miller Airpark. This expansion would provide access to the Cedar Creek and expand active County park facilities in Townships projected to receive substantial new residential development.
- **The County should acquire a regional park facility of at least 350 acres in the Mill Creek basin of Stafford Township.** The South Branch of Mill Creek traverses a potential site that includes uplands, lowlands, bogs and excellent examples of Atlantic White Cedar stands. This acquisition would provide a regional park in an area projected to receive substantial amounts of new residential development.
- **The County should develop a fertile, well-drained site with surface water to provide for the eventual construction of a 27 hole golf course and other recreational facilities.** A tract of at least 475 acres is required for this type of facility.
- ***The County should actively proceed with the development of existing park facilites.*** Also needed are continued improvements to the facilities for the Ocean County Fair at the Robert J. Miller Airpark.
- **The County should actively seek out and acquire properties that improve the public's access to water, including the County's rivers, bays and ocean.** Facilities that should be provided include fishing piers, boat launching ramps and swimming areas. The recently completed Riverfront Landing Park in Dover Township is an excellent example of required facilities.
- **The County should consider the acquisition in fee simple, use of conservation easements, or dedication of stream corridor areas.** Stream corridors are flood prone and should be protected from development. Public ownership would protect sensitive natural areas, provide water access and provide linkages between federal, state, County and municipal recreational areas.
- **The County should actively support the state goal embodied in the New Jersey Coastal Zone Management Plan of at least one municipal waterfront park in each coastal municipality.**

- **The Ocean County Planning Board should assist the Ocean County Parks and Recreation Department in monitoring growth trends and development activity.** The purpose of this recommendation is to provide an early opportunity to identify and acquire County park sites in rapidly growing areas before land values substantially increase or suitable sites are developed for other uses.
- **The Ocean County Planning Board should notify the Ocean County Parks and Recreation Department of** any development application that impinges or encroaches on existing County recreational facilities or sites identified for possible acquisition.

Agricultural land is an important natural resource that requires protection from incompatible land uses.

AGRICULTURE RETENTION

A planning objective of the Comprehensive Master Plan is the retention and enhancement of agriculture. The General Development Plan map identifies concentrations of open agricultural lands that are actively farmed and recommends their retention. Farmland preservation is an increasingly important issue throughout New Jersey and has been the subject of several major State initiatives.

In October, 1980 the NJ Department of Agriculture released the report Grassroots: An Agricultural Retention and Development Program for New Jersey. This report recommended a series of measures that could be taken to retain farmland in the State, including the passage of a bond issue to provide matching funds for the voluntary sale of development rights from agricultural lands and for land and water conservation measures. In 1981, the voters of the State approved a $50 million bond issue for these purposes.

In 1983, the Legislature enacted two laws, the Agriculture Retention and Development Act and the Agriculture Development and Farmland Preservation Act to implement the bond issue and to address other recommendations of the Grassroots... report. A major feature of this legislation is that Counties were given the authority to establish agriculture development boards. These boards were authorized to develop an agricultural retention program for their region through state and County cooperative

efforts. The boards were also authorized to establish guidelines and adopt criteria for identification of agricultural lands suitable for inclusion in agricultural development areas and farmland preservation programs consistent with the provisions of the Acts, and to assist in the implementation of a program of recommended agricultural management practices. Boards may also develop and adopt agricultural retention and development programs to encourage the agricultural business climate and the preservation of agricultural land.

The Ocean County Board of Chosen Freeholders established the Ocean County Agriculture Development Board (CADB) in 1984. To assist and encourage local farmers to voluntarily maintain their land in agricultural use, the County has participated in Farmland Preservation Programs through the CADB. Eligible farmlands are encouraged to be maintained in agricultural use in return for a variety of benefits which may include one or more of the following: sale of the development rights to agricultural land, with the land deed-restricted to farming; funding assistance for projects that improve soil and water conservation; protection from eminent domain for an eleven-year period; and, protection to continue farming in accordance with recognized best management practices through the "Right to Farm" provisions of the statutes.

The cultivation of cranberries and blueberries is centered in the Pinelands area of Ocean County.

The CADB recognizes that while agriculture as a whole is limited in its scope in Ocean County, it remains locally important. Moreover, it views the retention of agriculture as a program with multiple benefits to the people of Ocean County. Most importantly it assists the farmers in maintaining or improving the economic viability of their businesses. It also provides the farmer with protection against incompatible land uses. In addition it preserves open space, potentially at a lower cost to the public than fee simple acquisition. Finally, it preserves a reserve of prime open agricultural soils that will remain available for agriculture in the future.

In developing programs the CADB has been liberal in its outlook, structuring eligibility criteria so that virtually every farmer in Ocean County may participate if he so chooses. In 1986 the CADB formally designated general areas as Agricultural Development Areas.

or ADA's. These areas identify specific locations for participation in farmland retention programs. In addition, land development proposals and capital improvement projects proposed in the designated ADA's will be reviewed by the CADB for consistency with the objective of farmland retention. The County's ADA designations have received approval from the State Agriculture Development Board.

A major initiative in the farmland retention program is the voluntary sale of development rights on farmland, with the property remaining in private ownership permanently deed-restricted to agriculture. The costs for purchasing development rights are shared between the state and the County. At the request of the CADB, the Board of Chosen Freeholders has included a one million dollar budget item in the Capital Improvement Program that can be used for this purpose. This budget amount, matched with the state bond monies, has the potential to publicly acquire five million dollars of development rights to active farmland in Ocean County.

Consistency between municipal, County and state plans will insure a coordinated approach to growth management.

The Planning Board supports the activities of the Ocean County Agriculture Development Board and other relevant agencies to implement the provisions of the two agriculture retention and development Acts. The Planning Board will continue to participate, as authorized by statute, on the CADB. Its staff will perform technical reviews on land development proposals or capital improvement projects for their potential impact on farmland and farming activities. The Planning Board further supports the implementation of the easement purchase program to assist in the retention and development of agriculture within Ocean County.

CONCLUSION

The preceding sections of this chapter have presented the planning goals and objectives adopted by the Planning Board that form the conceptual framework of the Ocean County Comprehensive Master Plan. They have also discussed the major issues and influences that the Planning Board has identified as collectively impacting the future growth and development of Ocean County. Together they form the basis for the specific

recommendations, policies and actions required to preserve and enhance the significant environmental amenities of the County and develop a rational, efficient and productive man-made environment for current and future residents.

The Master Plan is intended to provide a framework for planning in Ocean County. The goals and objectives adopted by the Planning Board are the underlying principles that will direct the County's planning activities through the time frame of this Plan, and beyond. Their purpose is to provide a regional perspective for growth management against which individual projects and functional plans can be judged.

It is the belief of the Planning Board that the land use and policy recommendations of the Master Plan build on the many positive aspects of the County's past development and seek, through sound planning, to avoid future problems. This can be achieved by using the Plan as a policy statement on which land use, capital improvements and other decisions influencing the location and intensity of new development can be based. While the underlying principles of the Master Plan will not change, as a policy statement it may be necessary to adjust specific strategies as circumstances change or as new information emerges from future planning initiatives. If adjustments are required in specific functional areas they should be developed within the context of the goals and objectives of this Plan.

As Winston Churchill once said, "Those in the present, who seek to sit in judgement of the past, lose the future." Decisions that affect the future of Ocean County must reflect an understanding of the past as well as a thorough analysis of the present condition. The Master Plan is the most complete study of regional planning issues facing Ocean County prepared to date. The achievement of its policies can only be realized through coordinated and consistent decision-making at all levels of government. The procedures that will be utilized to implement the Master Plan are the subject of the concluding chapter.

CHAPTER 4
IMPLEMENTATION AND RELATIONSHIP TO OTHER PLANS

INTRODUCTION

The County and Regional Planning Act provides the statutory authority for County planning boards to prepare and adopt a County master plan. The Comprehensive Master Plan is an official public document adopted by the County Planning Board as a policy guide concerning the physical development of the County. It defines from a regional perspective how the County should develop over the long range planning period. The Master Plan addresses the major physical, social and economic elements which affect the area's physical development. The plan summarizes land development policies on a broad basis and provides a County-wide planning framework for the creation and administration of detailed regulatory programs or the completion of functional plans. While this is not a regulatory document, there are a variety of specific legal mechanisms through which the goals and objectives of the Plan can be achieved and specific policies and recommendations implemented.

Accomplishment of the Master Plan recommendations will result in future growth locating in areas suitable for additional development, thereby protecting environmental resources. It will also provide a range of appropriate types and intensities of land uses, achieve economic development, housing and other regional planning goals and provide a basis for infrastructure and capital improvement planning. The following sections describe the methods that will be utilized by the Planning Board to provide for the implementation of the Master Plan and also a discussion of the relationship of the Master Plan to various state, regional and local plans and programs.

STATE PLANS AND LEGISLATIVE ACTS

There are a variety of state plans which address individual land development planning issues such as water resources, transportation and recreation. The NJ Department of Environmental Protection has prepared several of these plans such as the Coastal Zone Management Plan and the Statewide Water Supply Master Plan. In addition, new laws were enacted during 1985 and 1986 to address the issues of fair housing and statewide land use planning. These plans and programs are described in the following section.

The New Jersey Statewide Water Supply Master Plan

In 1982, the NJ Department of Environmental Protection released the New Jersey Statewide Water Supply Master Plan to address water supply issues facing New Jersey. The plan provides a statewide framework for sound water supply planning and has been

designed to identify responsibility, needs and resource capabilities and to develop the tools essential to meet those responsibilities. The plan also contains an implementation program for its recommendations which rely on funding from the 1981 Water Supply Bond Act.

Ocean and Monmouth Counties have been designated as part of Region 2 in the State Plan. Recommendations for this region focus on the construction of the Manasquan Reservoir project, in Monmouth County. In addition, the preparation of comprehensive groundwater studies for the County are recommended. The Master Plan supports these recommendations and reflects them in its policies.

New Jersey Coastal Zone Management Program

The NJ Coastal Zone Management Program presents eight basic policies which give recommended objectives for all public and private land and water use decisions in the coastal zone. These policies measure a proposed development against component sets of locational, use and resource policies. The decision on any proposed use rests on a consideration of all relevant policies in the three areas and a weighing of the various interests in light of the goals of the overall program. Implementation is achieved through CAFRA, the Wetlands Act and the Waterfront Development Act.

Generally, the use and resource policies of the County Master Plan and the CZM program are compatible, because they are based upon a similar evaluation of land development capability and protection of environmental resources. Locational policies in the CZM are based upon three general regional growth strategies: development regions, extension regions and limited growth regions. While these strategies are basically consistent with the County Master Plan for the coastal area of Ocean County, some conflicts or inconsistencies exist. Since the Master Plan is based upon a comprehensive and detailed evaluation of County needs and physical resources the Planning Board strongly recommends that the CZM adopt the Master Plan recommendations as locational policies for the CZM program.

New Jersey Transportation Plan

The NJ Department of Transportation prepared a comprehensive statewide transportation master plan in 1984. Under the provisions of the NJ Transportation Trust Fund Authority Act of 1984, the Department was required to prepare this plan and to produce subsequent updates at five year intervals.

The state transportation plan is policy oriented and contains a short and long range element which correlates to current fiscal conditions. The plan addresses the role of the state, NJTCC and County and local governments in the transportation planning process. The state plan also incorporates the short-term transportation improvement projects identified in the County and state TIP. In addition, a variety of high growth corridors have been identified for in-depth analysis funded by state and federal dollars. Included in this section is the Monmouth/Ocean region which is the focus of a comprehensive transit alternatives study. These elements are consistent with the policies of the County Master Plan.

State Planning Act

In 1986, the State of New Jersey enacted the State Planning Act which established a seventeen member State Planning Commission. The Commission is responsible for the preparation of a 1987 State Development and Redevelopment Plan. This plan will identify regional land use policies and will serve as a guide for state investments in major capital improvements throughout the state. The 1987 plan will replace an earlier draft version known as the State Development Guide Plan which was prepared by the NJ Department of Community Affairs, but never formally adopted.

The 1987 revision to the Ocean County Comprehensive Master Plan was prepared in advance of the 1987 State Plan and is intended to address the County's land development issues from a regional perspective. Since the County Master Plan has been developed on a strong environmental and land use planning basis, the County recommends that the State Planning Commission incorporate the land use recommendations expressed in the plan to further the state effort toward consistency and coordination among state, County and municipal governments.

Fair Housing Act

A direct result of the Mount Laurel court decisions was the enactment of the 1985 Fair Housing Act, which requires all municipalities to develop and implement a housing plan to accomodate their 'fair share' of low and moderate income housing. The Act established an independent Council on Affordable Housing which is responsible for designating state housing regions, provide estimates of present and prospective housing needs and certifying adopted municipal housing plans. In addition, the Council offers protection to municipalities from Mount Laurel type lawsuits once their housing plan

elements are certified. The County's role in this program is limited to the review of regional agreements for housing transfers on a case-by-case basis.

REGIONAL PLANS

There are two regional planning and regulatory agencies which have jurisdiction over development issues facing Ocean County. The NJ Pinelands Commission regulates land use and development within the Pinelands Area which comprises nearly two-thirds of the County's land area. The second agency is a metropolitan planning organization known as the North Jersey Transportation Coordinating Council. The Council is responsible for cooperative decision-making on transportation issues affecting northern New Jersey. The following section briefly describes the formal plans adopted by each agency and their relationship to the Ocean County Comprehensive Master Plan.

NJ Pinelands Comprehensive Management Plan

The Pinelands Comprehensive Management Plan contains the substantive land use and resource polices adopted by the Pinelands Commission to manage development within the Pinelands Area. The New Jersey Pinelands Protection Act requires each County with jurisdiction over land located within the Pinelands Area to amend its Master Plan and land development standards to conform to the minimum standards of the Pinelands CMP.

Upon certification of a County's Master Plan and land development standards by the Pinelands Commission the County is authorized to grant, to the extent that it is so authorized by state law or County ordinance, any permits or approvals within its Pinelands Area jurisdiction, subject to Pinelands Commission review. All permits, approvals or other action taken by the County with respect to the development of land within the Pinelands Area must be in strict conformance with the certified County Master Plan and ordinances and the minimum standards of the Pinelands CMP.

The Pinelands CMP requires Ocean County to adopt, and submit for certification a Master Plan based upon a current and comprehensive inventory and analysis of the natural resources of the County. The land use policies and recommendations must be generally consistent with the provisions and minimum standards adopted by the Pinelands Commission. The County must include a capital improvements program that demonstrates that adequate and necessary facilities will be available to serve permitted development. Plans relating to solid and liquid waste management must also be in conformance with the waste management and water quality programs and standards contained in the Pinelands CMP.

Finally, all standards established for review of applications for subdivision and site plan approval for land development within the Pinelands Area, or any other permit or approval required by Ocean County as a prerequisite to initiating development in the Pinelands Area, must be in conformance with the minimum standards of the Pinelands CMP. The minimum standards include providing the Pinelands Commission with notice of the issuance of any County permit or approval.

The purpose of adopting the 1987 revisions to the Ocean County Comprehensive Master Plan was to bring the plan into conformance with the Pinelands CMP and the provisions of the NJ Pinelands Protection Act. In addition, the Master Plan was revised to reflect the acquisition program adopted by the Pinelands Commission. On February 4, 1987 the Ocean County Board of Chosen Freeholders adopted amendments to the Subdivision and Site Plan Resolution of Ocean County. This Resolution contains the standards established by the County for the review of applications for land subdivision and site plan approval.

The Board of Chosen Freeholders has adopted a 6-year Capital Improvement Program to provide for necessary County facilities, some of which are in the Pinelands Area. The Capital Improvement Program has been found by the Pinelands Commission to be in conformance and to contain provisions necessary to implement the objectives of the Pinelands CMP for the Pinelands Area of Ocean County.

The County has also prepared and adopted two functional plans that relate to the solid waste and liquid waste programs adopted by the Pinelands Commission. The Ocean County District Solid Waste Management Plan provides for the environmentally sound disposal of all solid waste generated in Ocean County. The provisions of this plan are consistent with the Pinelands Commission's requirements, and are contained in the Ocean County Comprehensive Master Plan. The Ocean County Areawide Water Quality Managment Plan, also summarized in the Master Plan, provides for the management of the County's water resources. The wastewater and stormwater management elements of the WQMP are also consistent with the minimum standards of the Pinelands CMP. These include the provision of wastewater facilities, the approval of on-site wastewater systems by the Ocean County Board of Health, the septage disposal manifest system and design and best management practices for the control of stormwater runoff.

Following adoption of the revisions to the Ocean County Comprehensive Master Plan and the Subdivision and Site Plan Resolution of Ocean County, the amended documents were submitted to the Pinelands Commission for certification pursuant to the provisions of the New Jersey Pinelands Protection Act. On June 24, 1987 the Executive Director of the Pinelands Commission issued his Report On Conformance of County Master Plan and Subdivision and Site Plan Resolution concluding that the County's submission

substantially met the minimum requirements for certification. On July 10, 1987 the Pinelands Commission adopted a Resolution certifing without conditions the County's application for certification.

The Regional Transportation Plan For Northern New Jersey

The North Jersey Transportation Coordinating Council is designated by statute as the Metropolitan Planning Organization for northern New Jersey. The NJTCC is responsible for conducting regional transportation planning activities and for administering the urban transportation planning process in accordance with federal regulations.

In 1986, the NJTCC adopted a regional transportation plan. The report presents short and long range goals, policies and recommendations regarding highway and transit system improvements for the northern New Jersey region, including Ocean County. The short-range section of the plan identifies specific transportation improvements, capital costs and an implementation schedule for projects on a County basis. These projects have been derived from the Transportation Improvement Programs prepared by the state and County.

The long-range element addresses intermediate and long-range needs which will be required to respond to population and employment shifts, to facilitate intra-County mobility, improve traffic flow and/or increase system capacity. The plan identifies specific projects for Ocean County which include the completion of Mule Road, the extension of Fischer Boulevard, capacity improvements to Hooper Avenue and the provision of mass transit on the Southern Branch rail line to Lakewood Township. Each of these projects are directly reflected and reinforced in the transportation element of the County Master Plan.

COUNTY IMPLEMENTATION

The implementation strategy for the County-wide land use plan relies in part on the exercise of existing authority provided to the County through governmental programs or legislation. This section focuses on the use of existing authority which regulates land development and highlights specific methods or programs.

County Development Review Procedure

The New Jersey County and Regional Planning Act provides statutory authority for the adoption of procedures, standards and requirements for the review and approval

of land development applications by County planning boards. The Ocean County Planning Board administers the Subdivision and Site Plan Resolution of Ocean County adopted by the Board of Chosen Freeholders. Land development applications are required to conform to the recommendations for roadways, drainage facilities, easements and/or rights-of-way for County facilities identified in the Master Plan or contained as standards in the Subdivision and Site Plan Resolution. Section 800 of the Resolution cross references all existing statutory or regulatory authority in one document and provides for a consistent application of these standards and regulations on all development review applications to implement provisions of a variety of County plans. These plans are identified in the subsequent section.

Ocean County Areawide Water Quality Management Plan

The Areawide WQMP presents land use and environmental recommendations to preserve and protect the County's water resources from growth-related sources of pollution. It was prepared pursuant to the provisions of Section 208 of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251) and the New Jersey Water Quality Planning Act (N.J.S.A. 58:11A-1). The plan has been conditionally certified by the Governor of New Jersey and approved by Region II of the United States Environmental Protection Agency.

All sewerage facility plans must be in conformance with the Areawide WQMP and all permits issued under the New Jersey Pollutant Discharge Elimination System must also conform to the plan. In addition, all other federally funded plans and projects must be consistent with its requirements. The plan also requires the control of point and nonpoint sources of pollution through the development and implementation of best management practices.

The Planning Board and Engineering Department are designated by the plan as management agencies responsible for control of stormwater runoff and other nonpoint sources of pollution. Toward this end, the Engineering Department has prepared stormwater management plans for certain drainage basins in the County, and developed a program to evaluate the design requirements of drainage facilities from a watershed perspective. Also, both structural and nonstructural approaches to improving the quality of urban runoff have been developed to prevent the degradation of the County's water resources.

Land development applications are reviewed for consistency with the requirements of the Areawide WQMP in accordance with the following provisions: all land development applications shall conform to the sewerage facilities requirements of the WQMP and must

employ best management practices for the control of nonpoint sources of pollution in the preparation of stormwater management plans and the design and location of drainage facilities.

Ocean County Parks And Recreation Master Plan

The Ocean County Parks Department has prepared an evaluation of park land, open space and recreational needs for the County. Associated with this analysis is a capital improvement program for the acquisition and development of identified park and recreational sites. This program is incorporated into the County Capital Improvement Program adopted by the Board of Chosen Freeholders.

Land development applications are reviewed for consistency with the requirements of the Parks and Recreation Master Plan. The Planning Board notifies the applicant and the Parks Department if an application includes all or portions of an area identified as a potential County park or recreation site.

Ocean County District Solid Waste Management Plan

The Board of Chosen Freeholders has adopted a plan to provide for the management, recycling and disposal of solid waste generated in Ocean County. This plan, the Ocean County District Solid Waste Management Plan, was adopted pursuant to the requirements of the New Jersey Solid Waste Management Act (N.J.S.A. 13:1E-1 et seq) and has been approved by the Commissioner of the Department of Environmental Protection as required by law.

The District Solid Waste Management Plan is comprised of three separate but interrelated elements. The first element is the recycling of reusable and marketable materials. The second element is the construction and operation of a resource recovery facility to incinerate the non-recyclable solid waste and generate steam for the production of energy. The third element is environmentally upgraded and secure landfills for the short-term disposal of solid waste and the disposal of residual and peak wastes when the resource recovery facility becomes operational.

The plan identifies two sites to be operated as regional landfill facilities, the Southern Ocean Landfill in Ocean Township and the Ocean County Landfill in Manchester Township. It also sets forth a phased program of closure for operating landfills and presents recommendations for future uses of closed sites. All solid waste facilities must be identified in the plan and any proposed sites must be included through a plan amendment adopted

by the Board of Chosen Freeholders, following review and recommendations by the Solid Waste Advisory Council, and approved by the Commissioner of the Department of Environmental Protection.

Enaction of the New Jersey Mandatory Source Separation and Recycling of Solid Waste Act (P.L. 1987, c. 102) commonly referred to as the Mandatory Recycling Act required the adoption of an amendment to the District Plan to establish a mandatory source separated recycling program county-wide. Under the plan adopted by the County, designated recyclable materials, and leaves for compost will be collected by municipalities. The County will cause to be built two recycling centers, one to serve southern municipalities and one for northern municipalities. The County recycling centers will process and market recyclables delivered to them.

The Plan also designates a site in Ocean Township (Waretown) for the construction of a mass-burn waste-to-energy resource recovery facility. Under the provisions of an Administrative Consent Agreement between the County and the Department of Environmental Protection, construction of the facility must commence by 1990 and the plant must be operational by 1992.

Land development applications are reviewed for consistency with the District Solid Waste Management Plan in accordance with the following provisions: applications for land development on or adjacent to abandoned, closed, designated or operating solid waste disposal facilities are reviewed for consistency with the plan's land use recommendations, and applications for solid waste facilities not contained in the plan as adopted by the Board of Chosen Freeholders require the approval of the Board of Chosen Freeholders.

Ocean County Subregional Transportation Program

The Subregional Transportation Program is a comprehensive planning program for transportation facilities and activities in Ocean County. Its programs are conducted pursuant to the provisions of the Federal Highway Act (23 U.S.C. 101) and Section 174, 175, and 176 of the Clean Air Act of 1977 as amended (42 U.S.C.)

The overall purpose of the program is to advance high priority transportation projects towards implementation. The program is administered in accordance with adopted plans and programs required by the Federal Highway Administration, Urban Mass Transportation Administration and the NJ Department of Transportation. Achievement of the facilities and services identified in the program are essential to implementing the overall transportation plan for Ocean County.

Relevant elements of this program which deal with planning, procedural and funding requirements include:

- **Transportation Improvement Program**
  A five year capital improvement program adopted by the Board of Chosen Freeholders and approved by the North Jersey Transportation Coordinating Council. This program lists all transportation projects eligible for federal funding assistance during the five year period. The program also includes projects funded under the State-Aid program.
- ***Transportation System Management Element***
  An alternative program to high-cost capital investments by making short-term improvements to existing transportation resources. Increased efficiency is achieved through traffic engineering and regulation, short-range planning solutions and public transportation improvements.
- **Air Quality Planning Program**
  The Air Quality Control Plan is the local component of the federally-required State Implementation Plan. The County must develop and implement reasonable, balanced plans to provide for the reduction of transportation system and stationary source emissions necessary to demonstrate attainment of National Ambient Air Quality Standards by the statutory deadlines.

Robert J. Miller Airpark Master Plan

The Robert J. Miller Airpark is a County-owned general aviation facility and recreation area located in Berkeley and Lacey Townships. Its Master Plan was prepared pursuant to the Federal Airport and Airway Development Act of 1970 under the guidelines of the Federal Aviation Administration Advisory Circular 150/5070-6. The Master Plan presents a long-range plan for the development and operation of the airport facilities.

To protect the public health, safety and welfare and to ensure the continued viability of airport operations, the plan presents recommendations on appropriate land uses located in the accident clear zone and flight paths. These recommendations are consistent with FAA noise and safety requirements. Land development applications are reviewed for consistency with the requirements of the Robert J. Miller Airpark Master Plan through the administration of the County's Subdivision and Site Plan Resolution. Applications are required to demonstrate consistency with the off-site land use requirements of the plan and Federal Aviation Administration air space review requirements.

Capital Improvement Program

The Capital Improvement Program contains a schedule of public, physical improvements for the County over a six-year period of time and reflects the County's priorities and financial capabilities. The program generally includes any major nonrecurring expenditures associated with the physical facilities of government such as the costs for acquisition of land, construction of buildings or other structures, construction of roadways and costs for fixed equipment.

County investments and expenditures for facilities such as new roadways, County facilities, sewers, and parks can directly influence the location and intensity of new growth. Many of the Master Plan recommendations identify new capital investments that will be required to either resolve identified problems or provide for future development. The annual Capital Improvement Program adopted by the Board of Chosen Freeholders should use the recommendations of the Master Plan as a framework for decisions on the location and timing of capital improvements. Specific plan sections that should be carefully followed include the Transportation Improvement Program and the Parks and Recreation Department's park acquisition and development program. The Planning Board will continue to review the Capital Improvement Program for such consistency on an annual basis as required by state statutes.

ADDITIONAL REGULATORY PROGRAMS

To provide for consistent and coordinated review procedures, standards and requirements of the Planning Board and other County agencies with statutory authority affecting land development within Ocean County, land development applications are reviewed for consistency with the requirements of the following County agencies through the administration of the County's Subdivision and Site Plan Resolution:

- **Ocean County Board of Health:** On-site wastewater treatment facilities and domestic water supplies pursuant to the provisions of the County Environmental Health Act (N.J.S.A. 26:3A2-21).
- **Ocean County Soil Conservation District:** Soil erosion and sediment control pursuant to the Soil Erosion and Sediment Control Act (N.J.S.A. 4:24-39).
- **Ocean County Mosquito Commission:** Control of mosquito populations and breeding areas pursuant to the New Jersey Department of Health Act (N.J.S.A. 26:9-1).
- **Ocean County Utilities Authority:** Provision of public wastewater treatment facilities, interceptors, industrial pretreatment, treatment of septage wastes

pursuant to the provisions of the Sewerage Authorities Law (N.J.S.A. 40:14A-01 et seq.).

- **Ocean County Engineering Department:** Stream encroachment permits for watersheds of less than 150 acres pursuant to the New Jersey Flood Control Facilities Act (N.J.S.A. 15:16A-1).

RELATIONSHIP TO COUNTY PLANS

This section provides a review of the relationship between the Ocean County Comprehensive Master Plan and the development plans of the three adjacent counties. This section discusses, in a general manner, the compatibility of land development policies in contiguous areas of these adjacent Counties.

Atlantic County

In 1981, the Atlantic County Department of Regional Planning and Economic Development prepared the Atlantic County, NJ - Future Land Use Plan. This plan, however, has not been formally adopted by the Atlantic County Planning Board. The land use map contained in the report does however present the County's conceptual recommendations for future land use. The boundary between the two Counties lies within Great Bay and the Little Egg Harbor Inlet. The land areas north and south of the bay are predominately tidal wetlands and are designated as public open space by both Counties. Most of this land area is federally-owned as part of the Barnegat and Brigantine Divisions of the Edwin B. Forsythe Wildlife Refuge. Therefore, the Atlantic County draft plan is consistent with the future development recommendations of the Ocean County Master Plan along their common boundary.

Burlington County

Burlington County possesses no official land use plan, rather the County relies on the policies and recommendations contained in the Regional Development Guide for the Delaware Valley, prepared by the Delaware Valley Regional Planning Commission in 1982. The Year 2000 Land Use and Open Space Plan map, adopted in October 1979, defines existing and projected development areas as well as open space and agricultural areas.

Western Ocean and eastern Burlington Counties are highly compatible in character, displaying a rural settlement pattern. The land use recommendations for Burlington County

adjacent to the boundary predominately indicate areas of existing and proposed open space preservation and conservation designations. These land use recommendations are consistent with the recommendations of the General Development Plan contained in the Ocean County Comprehensive Master Plan.

Monmouth County

In 1982, the Monmouth County Planning Board adopted the Growth Management Guide as its official County master plan. The Monmouth and Ocean County Master Plans reflect a consistent approach toward future development along their boundary.

Both future land use maps recommend suburban density growth in the Route 9 corridor and coastal region where water, sewer and transportation infrastructure exist. The Ocean County plan also recommends low density residential development for Plumsted Township which is consistent with the Monmouth County recommendations for Upper Freehold Township in Monmouth County. In addition, both Counties have designated land areas for agricultural retention near the County boundary. North of the I-195 corridor, the Monmouth County plan designates a portion of Freehold Township for agriculture and conservation uses while the Ocean County plan recommends several industrial areas. In general, however the future land use recommendations of the Counties are consistent and compatible.

MUNICIPAL LAND DEVELOPMENT PROGRAMS

Municipal governments have the primary role in the land use planning and regulatory process in New Jersey. Municipalities prepare local master plans which include a land use element to serve as the basis for zoning standards. Local government directly controls land use through the administration of zoning and building regulations that control the extent, location and intensity of land development.

Each of the County's thirty-three municipalities have prepared local master plans which have been adopted by the local governing body. The County Master Plan contains a variety of valuable information for regional and local planning purposes and is intended to be used as a policy statement to guide municipalities in the preparation of plans that address local planning issues.

Most of the County's municipalities have local plans that are consistent with and refine the regional land use recommendations presented on the County's General Development Plan map. As municipal plans are updated in accordance with the requirements of the Municipal Land Use Law and the State Planning Act, the County will

continue to review these plans for consistency with the County plan. Continued cooperation between municipalities and the County will help achieve the successful implementation of the goals and objectives embodied in the Ocean County Comprehensive Master Plan.

SUPPORTIVE PLANNING STUDIES

The County Master Plan represents a comprehensive examination of the major issues affecting the future development of Ocean County. The Plan has been based on a variety of technical reports which address in detail specific issues such as population, land use, environmental resources, solid waste and transportation. The following list identifies the major studies undertaken by the Planning Board and other agencies which were utilized in the preparation of this Plan and are adopted as basic studies to the Ocean County Comprehensive Master Plan:

- **Natural Resource Inventory for Long Beach Island**
- **Population, Land Use and Environmental Resources**
- **Groundwater Management Planning**
- **Stormwater Management**
- **Technical Design Manual for Stormwater Management**
- **Surface Water Quality Assessment**
- **Surface Water Quality Assessment Addendum**
- ***Ocean County Soil Survey***
- **Soil Erosion and Sediment Control Inventory**
- **Septage Management**
- **Regulatory Program Associated with Areawide Water Quality Management in Ocean County**
- **New Jersey Historic Sites Inventory for Ocean County**
- **Ocean County District Solid Waste Management Plan and Amendments**
- **Recycling in Ocean County**
- **Resource Recovery in Ocean County**
- **Restoration of Passenger Rail Service for Northern Ocean County and Central Monmouth County**
- **Restoration of Passenger Rail Service - An Update of Corridor Growth**
- **Robert J. Miller Airpark Master Plan, Vols. I & II**

NOTES